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ABSTRACT

Intended for college teachers of geography, especially those teaching about developing countries, this publication contains background information about urban conditions in India. Historical and contemporary accounts of urban planning are provided for three Indian cities. The city of Jaipur was built by a maharaja in the 18th century, long before the British became a major urban force. The study of this city allows geographers to see the development of a planned city, in a unique region of India, over a period of 250 years. Delhi, the second city studied, became the capital of India in 1912, and New Delhi was created during the 1920's and 1930's to satisfy the particular needs of the British. The study of these cities focuses on the collision of Indian and colonial forces during the last 100 years. The third city studied is Chandigarh, a city that is entirely post-independence and, therefore, noncolonial. Built for Indian purposes to Indian specifications, but admittedly mainly by foreign architects, it allows geographers to identify both the aspirations and the reality of urban India during the last 25 years. (RM)

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Occasional Papers

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Extramural Division

School of Oriental and African Studies

University of London

PLANNED CITIES IN INDIA

NEIL E SEALEY

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PLANNED CITIES IN INDIA

by
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Cover: The cover is illustrated from photographs supplied by the author.
Front cover Jaipur. Trinoliya Bazaar as seen looking west from Manak Chauk. This view should be compared with that in figure 4 (p.11). Many of the details referred to in the text are visible.
Back cover (top) Chandigarh. Shops and businesses at the corner of Sector 30 in Chandigarh. The traffic circle is at the junction of a V3 road (Udyog Path, looking NW, the road the shops are on) and a V2 road (Chandi Path).
Back cover (bottom) New Delhi. Kingsway (Raj Path), in the heart of New Delhi. The view is from the rise of Raisina Hill looking east to the War Memorial Arch (India Gate).

PREFACE

This study is the fifth in a series of Occasional Papers published by the Extramural Division of SOAS and is one of a number planned on different aspects of the Development process. As such, we hope it will be of interest not only to teachers of geography but also to those concerned with Development Education.

The author, Neil Sealey, taught at Luton College of Higher Education and is a former SOAS Teacher Fellow. He also edited *Teaching Geography* before taking up his present post in the College of the Bahamas.

E O'Connor
Organizer of Extramural Studies
School of Oriental and African Studies
October 1982

AUTHOR'S NOTE

The purpose of this study has been to draw attention to the urban situation in India, and to make available to teachers in particular some of the material largely neglected by the text books, but which is nevertheless of value at the school level.

The study as it stands is a truncated one. Having visited the cities of Jaipur, New Delhi and Chandigarh in the summer of 1978 I was prompted to pursue the subject of the planned Indian city by way of an examination of the available literature during the winter of 1978-79 and to return to India in the summer of 1979. In the event I was offered a post abroad and had to abandon for the time being the final piece of fieldwork.

As a result there are some gaps in both the historical and contemporary accounts, and no doubt the strengths of some of the arguments should be weighted differently. I am hopeful that despite this the study will be of interest to those teaching courses on the underdeveloped world, and should the opportunity present itself a more comprehensive piece of work may be undertaken and include what I feel is most lacking, namely a set of photographic illustrations to accompany the text.

As implied, this study has depended very much on my interpretation of existing material rather than original fieldwork. In most cases there has been no previous attempt to study these cities from this particular point of view, but there is one outstanding exception. This is the work of Anthony D. King entitled *Colonial Urban Development* which I found to be both a major factual resource and a great inspiration for the section on New Delhi. Anyone who wishes to consider the Delhi situation further, or pursue the development of the colonial city in general, should refer to this book. (A. D. King, 1976).

I am most grateful to Luton College of Higher Education for providing some study time during the latter four months of 1978; to the School of Oriental and African Studies (University of London) for the assistance given by the Library, the Extramural Division and the Geography Department; to the staff of the India Office and of the library of the Royal Institute of British Architects, and to Dr Chandra Pal Singh at the Delhi School of Economics, for services rendered.

Neil E. Sealey.

July 1979.

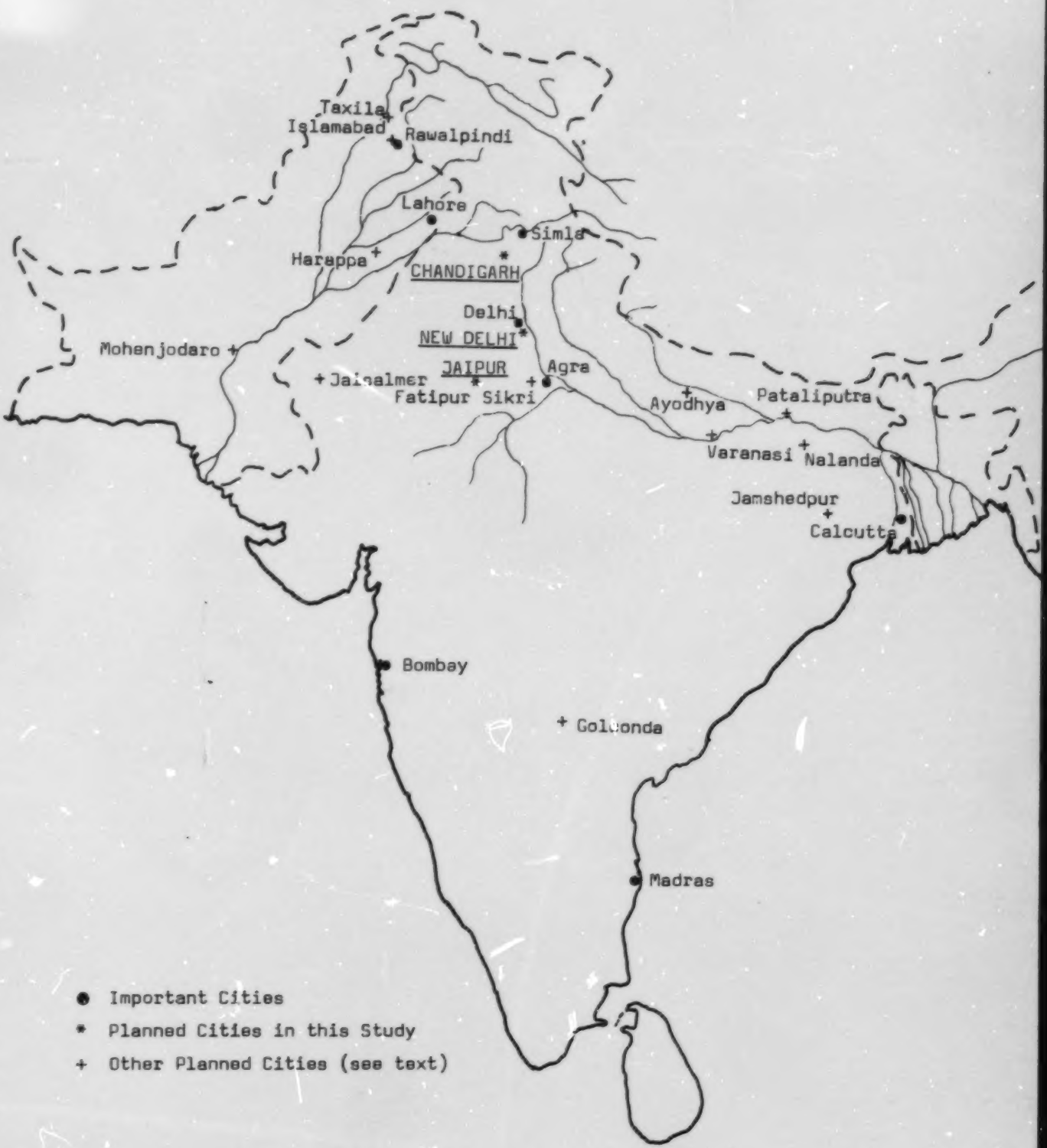

Figure 1: Location of ancient and modern planned towns, and other cities mentioned in text

INTRODUCTION

Today it is readily accepted that although the majority of the population of the underdeveloped countries is non-urban, such countries have severe urban problems. Indeed, some of the worst, or at least the most quoted, examples are from India where over 70 per cent of the population is rural.

Many of the problems, mainly related to housing, sanitation, transport, employment, and income distribution are not peculiar to India or the underdeveloped world, but also occur in the West. The West has, however, often managed to overcome these problems by major capital investment, and herein lies the first significant difference between the two areas, for naturally this is not the remedy available to poor countries.

This is only part of the problem, though. Many of the symptoms that seem similar to those in Western cities are in fact the produce of different circumstances, and consequently the solution that works in one area - for example, the flats or apartment buildings so common in Eastern Europe or the USA - have been notoriously unsuccessful in the underdeveloped world - Caracas is a well-studied case.

There was undoubtedly a time in history when cities evolved and functioned along similar lines in the West and the East, but with the onset of modern urbanization in the West there was a divergence between these two culture areas, and most of the current problems seem to be a product of the transposition of alien western mores to the still traditional underdeveloped societies, and the superimposition of one culture onto the other. In India the conflict is even now hardly to be seen in the countryside, but in the towns Kipling's dictum of East and West is as valid as ever and the division between 'western core' and 'shanty' or 'bustee', is not simply a matter of land use but is an inherent element in the problems of larger cities. Similarly, while it is the western problems that have been studied widely, the special problems of Indian cities are at least as important, but less understood, often as a result of having been interpreted erroneously from a western viewpoint. Even when properly understood this has hardly been apparent in urban policies until quite recently. (But see the *Calcutta Metropolitan Development Plan*, 1961 and later revisions.)

To isolate these aspects of urban life is not so easy given the complexity of modern Indian cities, but there is nevertheless one way of attempting to do so that has been neglected so far. As King (1976:182) points out "India represents one of the oldest and most highly developed civilizations whose known history of continuous urban settlement goes back at least four and a half thousand years". Thus right from the start we have a highly developed system in conflict with the immutable forces of western colonialism.

Indian civilization has always been active and innovative in the urban sphere, and over the centuries settlements in India have been consciously created and planned. Examples extend as far back as the Indus Valley civilization (T. J. Manicham, *et al.*, 1962) which created the large capital cities of Mohenjodaro (on the River Indus in Sind), and Harappa

(on the River Ravi). Whittick (1976) considers these to be the oldest examples of systematic town planning in the world, and examination of their ruins shows remarkable regularity of layout, with broad streets crossing the cities at right angles to form blocks 400 yards by 200 yards, in anticipation of the later plans of Jaipur and even Chandigarh. These were followed by Ayodhya (see Figure 1), Pataliputra (this site is now occupied by Patna) and Varanasi built by the Indo-Aryans in the Ganges Basin during the Vedic period (1500-600 BC). In the Buddhist period (600 BC to AD 200) Nalanda and Taxila were laid out as university towns; and in medieval times (twelfth century) the fortess towns of Golconda in the Deccan and Jaisalmeer in Rajasthan were created. The Moguls (sixteenth to nineteenth centuries) built the original city of Fatehpur Sikri (1578) near Agra, but later abandoned it, and most notable of all, the present Old Delhi or Shajahanabad (1648). However, all these towns and cities have either been overwhelmed by later developments or lie in ruins, and the most relevant to contemporary study are Jaipur, built by a maharajah in the eighteenth century, New Delhi, mainly a product of the colonial era (but nevertheless being mimicked by the creation of Islamabad in Pakistan, which is in effect 'New Rawalpindi'); and the as yet incomplete Chandigarh, capital of the Indian Punjab. It should be noted that there are at least twenty other new towns or cities in varying degrees of development from this same period of the twentieth century.

The point of this review is that if we look at cities such as these today we are at least starting from a known base - the original plan. The architects' and planners' concepts provide a 'control' in respect of what could have been expected to develop, and the reality is there to compare with this view. In this way perhaps it will be possible to isolate and identify the forces at work in Indian cities and then use them to understand further the complexities of the vast majority of the other, unplanned, cities. If the designers of these earlier planned cities identified correctly the forces at work then their creations should have functioned efficiently, at least during the period for which they were designed. Alternatively, their failures will be apparent. In either case we have the advantage, in theory at least, of knowing how it was planned to accommodate the various functions of the Indian city, and indeed just what these were thought to be, and success or failure alike can point up the specific elements of urbanism which bedevil urban development at present.

Jaipur was started long before the British became a major urban force, and their presence in Rajasthan in this respect was always minimal anyway. Its study allows us to see the development of a planned city, admittedly in a somewhat unique region of India, over a period of 250 years.

Delhi became the capital of India in 1912 and New Delhi was created in the 1920s and 1930s to satisfy the particular needs of the British administration. It represents the collision of Indian and colonial forces during the last hundred years.

Chandigarh is entirely post-independence and therefore non-colonial. Built for Indian purposes to Indian specifications, but admittedly by mainly foreign architects, it can allow us to identify both the aspirations and the reality of urban India in the last quarter of a century.

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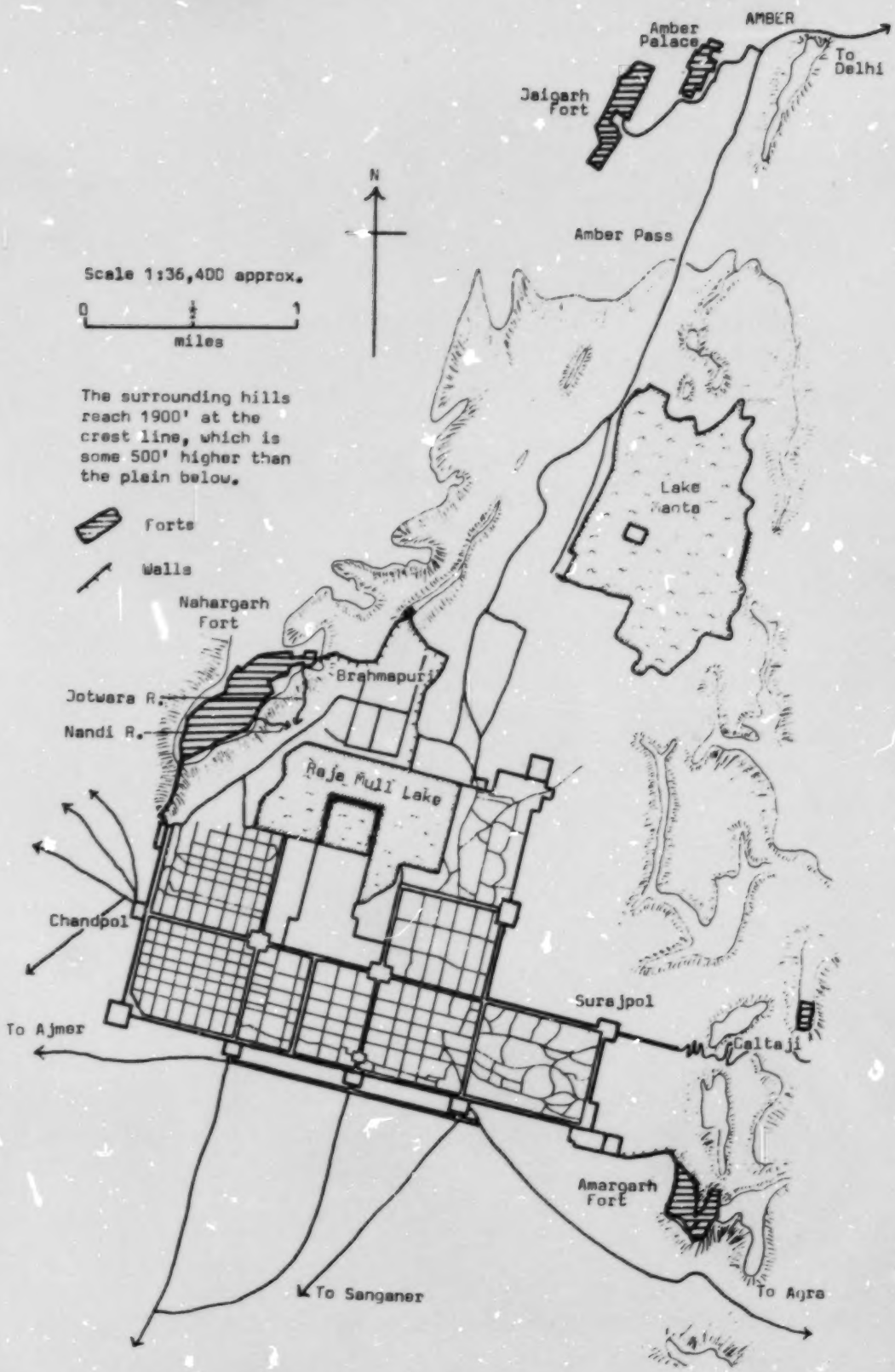

Figure 2: Position and layout of Jaipur
(Based on 1865 map)

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JAIPUR

This city was founded in 1727 to replace Amber as the capital of the Rajput state of Jaipur. Its creator was the Maharajah Jai Singh II (1687-1743), noted for his scientific, engineering, architectural, and astronomical studies and achievements, but especially for his *Yantras*, or astronomical observatories, built at Delhi, Jaipur, Benares (Varanasi), and Ujjain.

The original settlement in this region was Amber (see Figure 2), founded in 967 AD. This was a fortress in the hills of the Aravalli Range which rise to about 2,000 feet here and are some 500 feet above the surrounding plain. Population growth, peace, and increased trade led to the search for a roomier but still defensible site nearby. Jaipur was laid out in a triangular embayment of the plain, believed to be part of the old lake bed of the now shrunken Lake Maota, to the south of Amber, thus being surrounded by hills on all sides except the south - the direction in which virtually all recent growth has taken place. These hills were subsequently surmounted by forts, notably Nahargarh (*garh* = fort) or Tiger Fort in the north west, and so provided the necessary defence in an area still prone to warmongering.

This area was clearly important in its own right, for it was bisected by the Delhi-Sanganer (an important town 7 miles to the south) road which utilized the narrow Amber pass to the north; and bounded in the south by the Agra-Ajmer road, which subsequently became the city's southern boundary. In addition it was well used by the Maharajah who hunted the area below Nahargarh Hill and around Raja Mull-ka-Talao (= Lake of Raja Mull) and had already built a hunting lodge-cum-palace and gardens known as Jai Nivas, and near to it a tank (ornamental reservoir) known as the Talkatora. His second observatory (the first being at Shahjahanabad or Old Delhi) was also begun nearby.

Given the suitability of the terrain - generally flat - the excellent defensive positions and communications, and the availabilty of water from rivers such as the Jotwara and Nandi draining into the Raja Mull Lake in the west, Jai Singh determined that his new city should be centred on his existing buildings. There was otherwise little settlement apart from a few villages towards the east, and ample scope for the realization of his own vision of a city at once scientific and harmonious with man and the physical environment.

In perceiving the nature of what was to follow, and in particular its contrast with later developments at Delhi, it is worth attempting to define the particular character of Jai Singh. He was of course, like the British in Delhi, the supreme civil and military authority, and was building an administrative capital - just as were the planners of both New Delhi and Chandigarh. Of necessity he was a soldier and served with distinction to raise Amber from a small principality to a major city state. He was not, however, a warrior by nature and achieved peace for his state by strategy and statesmanship. He was also the religious leader of his state, devoutly religious, and renowned throughout India as an arbiter in such matters. The consideration given to existing villages and their temples attests to this, the latter being left undisturbed, even if located in the

middle of a proposed road, and his plans were modified to accommodate as much as possible of the existing layout.

In addition Jai Singh was clearly a scholar and is known to have studied both Eastern and Western literature in several disciplines, and his town planning appears to exhibit elements of both European and Indian thought. In an era (the Mughal period) noted for its authoritarianism his social concern was remarkable. At a time when cities like Shahjahanabad and Agra were dominated by their respective Red Forts, and architecture was spectacular rather than functional, he was able to achieve both military security and outstanding design without being compromised by either. As a result Jaipur exhibits a uniquely successful combination of site planning, street layout, and land use.

Jaipur represents a conscious advancement in the evolution of town planning in India. Its two most outstanding characteristics - the sectional layout and the neighbourhood units (known as *havelis*) - both succeed naturally from traditional ideas and herald the modern era exemplified by such cities as Chandigarh, with which it clearly has much more in common than the rather anachronistic New Delhi.

The formal layout of temples may well have been the origin of town planning in India, and such, mainly geometrical, layouts were subsequently applied to Aryan villages. The village represented a single unit in community life, and towns were largely multiples of the village concept laid out on the grid of a new town plan (Whittick, 1976). Most grids were based on circles or squares, the former to emphasize the hierarchical relationships of the central power to the periphery, and the latter to satisfy the simple geometry usually incorporated in native mythology and religion. Thus the nine squares plan formed from the intersection of two pairs of roads at right angles was especially favoured in many designs as its unique central unit possessed all the attributes of the centre of a circle, while the rectangular grid made for greater ease in communications and land use.

Jaipur is not, however, an abstract or even theoretical construct which happened to be successful in reality. It is a product of theoretical study carefully considered and applied to existing social patterns and topographical limitations, and once the site was chosen and the plan conceived, Jai Singh entrusted the details of the layout and architecture to a proven employee, a Bengali-Brahmin clerk named Vidhyadhar (surname Chakrabarti?) who had earlier shown his skill and efficiency in and around Amber, and who later became the State's Revenue Minister.

Drawings in the City Palace Museum show various attempts by Vidhyadhar to meet Jai Singh's wishes and match the plan to existing features. Important points were the need to keep Jai Singh's earlier buildings within the central area, the need for defence, and 'astronomical' orientation with respect to the cardinal points of the compass. In the latter case a rotation of some 15 degrees clockwise from a true east-west line was accepted in order to keep the main road from Chandpol (= Sun Gate) to Surajpol (= Moon Gate) along a slight ridge and thence along the existing road to the springs and temples of Galtaji, a village in the eastern hills.

The palace buildings were constructed south of the lake and only the Brahmin town of Brahmapura (see Figure 2) was allowed to lie north of them. This area was not walled and the logical north west sector is in fact absent as a result of the displacement to the west caused by the presence

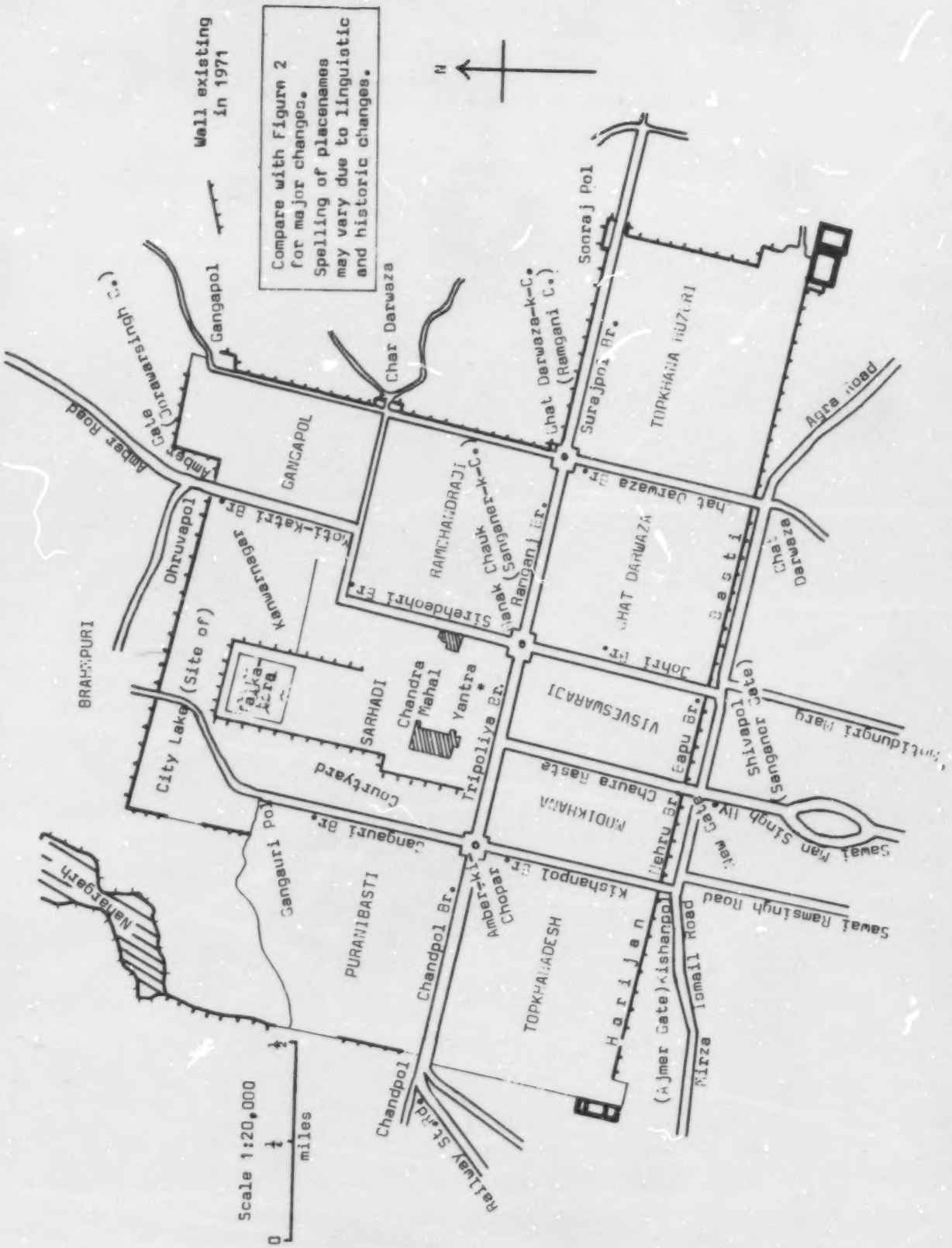

Figure 3: The Planned City
(Based on 1971 Jaipur Guide Map, Survey of India)

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of the lake and existing buildings. Whether the existing sector of Top Khana-Huzuri was meant to be the missing ninth sector, or it was simply a logical eastern extension of the city, is not known. It does however incorporate an existing village, hence its irregular street pattern, (see Figure 2) and it was built last of all, the land requiring levelling in this area. It does extend the defensive perimeter to the east, and aided the sealing of the embayment which was completed by the construction of the major forts of Nahargarh in the west and Amargarh in the east, and the extension of walls from the nearest parts of the city up to these two forts (see figure 2). Thus the actual southern boundary of the town was immediately north of the Ajmer-Agra road which did not enter the city.

Although often described as a square divided into nine blocks, it is clear that this is hardly a realistic description and belies the sensitivity of its creator in placing utility before geometry. The opposite has been said about New Delhi. Thus the design of Jaipur, despite the absolute authority of its ruler, marks a shift from the epic cities of the Mughal emperors (e.g. Fatehpur Sikri) designed to display pomp, power and glory, to the needs of the people, and its almost continuous growth to a population of 637,000 in 1971 making it the fourteenth largest city in India, attests to this.

Today the planned city of about three square miles is only part of an urban area of some 25 square miles, but fortunately little of the original identity has been lost. Clearly in being planned as a walled city its expansion was physically limited, although as will be seen its enlargement within the concepts of the original plan would have been quite possible. In this respect it anticipated Chandigarh and surpassed New Delhi. The city was eventually surrounded by a wall 25 feet high and 9 feet thick. This was cut by seven gateways *(pols)* but an eighth was later added between Ajmer and Sanganer Gates to connect the important commercial street of Chavra Rastra with the new road known as Sawai Man Singh Highway (see Figure 3) leading to Sanganer. Bastions and towers at regular intervals completed the fortifications.

As well as defence the hills provided water, the main source being the drainage from Nahargarh hill which was directed into the city lake of Raja Mull-ka-Talao by means of a natural ravine containing the River Nandi; amd the River Jhotwara, and aided by a series of massive man-made outfalls known locally as the Bara-Mori. At a later date this supply became inadequate and had to be supplemented by canals and then by road from a source one and a half miles away to the west. In 1874 iron pipes were built to the Aman-i-Shah River, four miles away, and raised some 100 feet to the city level by steam pumps. The natural drainage was to the south across the Plain and created no problems, in this respect resembling the site of Chandigarh which is flanked by stream beds instead of hills, but likewise confined to three sides.

Such was the natural setting for the planned city. Although based on a modified pattern of squares partly explained by the topography, there is reason to believe that the lack of symmetry was not entirely due to this. In Hindu mythology a perfect square is believed to bring ill-fortune and it is a fact that the east-west dimension of the basic grid measures 1.6 miles as against 1.3 miles for the north-south direction. The subdivisions are thus not square either. It is also conceivable that the addition of the ninth subdivision in the south-east was also prompted by mythology as the sectors (known as *chowkris*) are reputed to represent the nine treasures of the god Kuvera, the God of Wealth (Kohli, no date); or alternatively (!) the nine divisions of the universe (M. R. Anand, 1977).

Figure 4: A typical *bazaar* street and *chaupar* as originall planned. Note the temple in the street, an example of the planners reluctance to remove existing features (Reprinted from *Marg*, Vol. 30, September 1977, p.51)

Another departure from regularity is the increased size of the Palace and eastern sectors. Both of these are one-and-a-quarter times the size of the others and there has been some speculation as to the reason for this. The maharajah was in fact dubbed *Sawai* Jai Singh by Emperor Aurangzeb when he was a child, and he retained this epithet throughout his life. It means 'one and a quarter' as the Emperor apparently recognized qualities in Jai Singh that would make him that much more accomplished than his father!

The blocks of *chowkris* can be considered as the sectors of modern town planning as in Chandigarh, and like them the scale is closely related to movement times. Here it was the human capacity for walking that was considered and the distance along an east-west side is about 900 yards - almost identical to a Chandigarh sector's short axis - and represents a ten minutes' walk. This is in fact a much bigger unit than seems to develop traditionally, but is one found in other planned towns such as Fatehpur Sikri and Shahjahanabad. In Chandigarh it is apparent that this distance served both mechanically propelled vehicles - about one minute's travel time between sectors - and the pedestrian, for the main shopping street runs the full width of each sector. In anticipation of Le Corbusier's formal road planning (see section on Chandigarh) Jai Singh II divided his sectors with roads 108 feet wide. Within the *chowkris* are successively smaller roads, the access roads being 54 feet wide and dividing the sectors into blocks *(mohallas)* which themselves have lanes half as wide again (27 feet), and this continues down to the narrowest lanes, called *rastas*, only 13 feet wide. The main roads were designed to be, and still are, the main commercial zones, and they are called *bazaars*. In this respect they are the antithesis of Le Courbusier's throughways, which are designed only for traffic and in many areas deliberately prohibited to the pedestrian. Chandigarh's sectors are inward looking and self-contained. Clearly traffic has changed and the function of the main thoroughfares with it in Jaipur.

The *bazaars* were obviously not built for fast-moving traffic but rather as the commercial areas of the city. Pavements extended as much as 25 per cent of the street width on either side of the road, and land use was restricted to shopping and other commercial uses. No houses were permitted to open on to the main streets, and the shops were strictly controlled in respect of size and design, which allowed for about 160 on each side of the sector (see Figure 4). Building heights were about half the road widths - three or four storeys - but the ground level shops were surmounted by a terrace reached by steps from the pavement, so that the increase in height was achieved in stages, and the pedestrian area increased, the whole effect being to enhance the width of the street and maintain proportions. Le Corbusier himself was inspired to incorporate some of these ideas in work he undertook in Ahmedabad. Every detail of the construction was laid out in Vidhyadhar's drawings and strictly enforced. To this end all the shops were initially built by the state.

Another contrast with Chandigarh lies in the use of the two main intersections. Instead of being traffic roundabouts the squares or *chaupars* were designed as pedestrian areas for leisure or business. As such they were large - 110 yards square - and contained fountains fed by acqueducts laid beneath the street. These have since been filled in and the squares reduced in size and grassed over. A third *chaupar*, Ramgani Chaupar, was added some time later at the next intersection to the east.

Both the street architecture and squares have been much modified

since Jai Singh's day, particularly so in the case of the shop fronts. This has been mainly due to the covering in of the terraces and pavements so as to provide more shade for an increasing population. Originally no trees were planted in the streets so as to allow the architecture full reign, and given the remarkable unity of the design this was understandable. Further, the open terraces were originally intended as viewing platforms for the growing number of processions that took place as the city expanded, and on such occasions "the whole city became a dynamic stadium" with "its streets - the stage - throbbing with life ... Its enthusiastic, appreciative spectators filled in every available space at all levels" (M. R. Anand, 1977).

The desert setting facilitated the open plan layout, but the sun had to be contained at the same time. Fountains in the squares have already been mentioned, but there were many other attempts to modify the local climatic conditions. Building fronts avoided openings that let the sunlight in, but were designed to allow the free penetration of air and indirect daylight only, usually by means of latticed stone screens - *jallis* - fitted into arches. Sun shades known as *chhajjas* and consisting of slabs of stone laid horizontally were carefully placed at all levels to create deep shade on the external walls.

The layout of the residential area has been the key to the future of all these cities, and here there are genuine similarities with Chandigarh. Traditionally Indian society, whether urban or rural, lived in communities distinguished by caste and sub-castes which generally reflected occupations. Plots in the *chowkris* were allocated on this basis, with the higher castes being located closest to the palace and the lower castes against the city walls. Despite the disruptions of the last hundred years this distribution still holds within the walled city, with the north east sector of Gangapol distinctly low caste and containing many animals, and the whole inner area along the southern wall, known as the Harijan Basti, also of poor quality except where it has been cleared on either side of the New Gate to provide room for two markets, the Bapu and Nehru Bazaars, established for the use of the Sindhi and Punjabi refugees who flocked to the city in 1947 (I.Pal, 1968). (See Figure 3.)

The subdivisions (or *mohallas*) of the sectors are thus named after the occupations of the dwellers (cf. New Delhi's system of street names described later), although in general the main names tend to be geographical. For instance, the gate names refer to the places they lead to and even those named after gods, such as Krishnapol and Shivapol, have geographical alternatives - Ajmer and Sanganer gates for the examples given. Soorajpol = Sun gate on the sunrise side; Chandpol = Moon gate on the sunset side; Dhruvapol = North Star gate on the north side, often called Amber gate; and Ghat Pol = Gap gate leading to the Purana Ghat, the pass for Agra. However, later names follow the British custom of being those of notable people - the new residential areas include Ashoknagar (*nagar* = town) and Adarshnagar; and new roads include Sawai Man Singh Highway and Mirza Ismail Road. The main streets - the *bazaars* - are named after their respective gates where relevant, and Tripoli Bazaar means leading to three gates (tri-pol). Chaura Rasta means simply 'wide street'.

A typical *chowkri* contained about 40 *mohallas*, each *mohalla* being occupied by families following a similar occupation and organized in a somewhat similar fashion to the medieval trade guilds of Britain and Europe. Socially they would be linked by a local temple, but the most important neighbourhood unit was the *haveli* (derived from the Persian

usage for an enclosed space) which consisted of a residential block as much as four or five storeys high built around an open court. This latter contained several communal facilities such as the well, washing area and children's playground. Anand (1977), describes this as "the smallest survival unit", and the arrangement was typical elsewhere, and when necessary could serve as a miniature fort with all the residential entrances on the inside leaving only one easily defended central gate to allow access to the courtyard from the outside. Commonly the lowest storey housed various commercial activities - shops, services, craft industries, workshops and so on, with the residential areas above, and thus the whole *haveli* could be regarded as a self-contained unit.

Seven of Jaipur's *chowkris* were devoted to the people, and the other two to the maharajah's palaces and lakes. The lakes were largely ornamental and of religious significance, the 100 acres of the Raja Mull being stocked with crocodiles. It has now been drained and reclaimed, and occupied by the settlement of Kanwarnagar in the east, but is still vacant elsewhere. The inner lake Talkatora was entirely artificial and bounded by the palace in the south and an embankment once decorated with fine gardens on the other three sides. Several pavilions still stand on the northern bank.

The palace area itself is a mixture of private residences for the maharajah and his family and servants, various halls of attendance, parks including the famous observatory or *yantra*, and public offices. As the maharajah was the absolute ruler this was the administrative and legal centre of the city, and remained so until the creation of the State of Rajasthan out of the collection of princely states of which Jaipur was one. As Jaipur now became the capital of all Rajasthan its administrative area had to be greatly enlarged, but some local offices still occupy the Chandra Mahal (city palace), for instance.

This then was Jai Singh II's creation, He died before it was completed and some of the present architectural features were not his, nor was the city originally painted pink. It was in fact white until the time of Maharajah Ram Singh II who ruled for 53 years until 1888. This ruler experimented with different coloured streets, which he paved, and introduced the pink colour seen today in an attempt to cut down the glare. The result has made the city famous, and the mixture of local lime and underburnt terracotta which is used is particularly effective in providing a harmony between nature and the city. Many public buildings were constructed outside the city during his reign, and he also provided a sloping roof over the paved area of the *bazaars*. This was later removed and replaced with first of all iron sheets, and then a rather plain but functional colonnade. Construction by other rulers consisted mainly of temples.

The architecture that distinguishes Jai Singh's city is essentially Indian in character and grand in scale. By using a very fine grained mortar it was possible to maintain a delicate appearance while at the same time building to large proportions, and Jaipur is particularly noted for its variety of arches, tapered columns, domes of all shapes, occasional ramps instead of steps, assembly halls, courtyards and mammoth gateways (Kohli, no date).

The question today is how has this eigthteenth century city served its population and survived the technological changes and growth of the twentieth century?

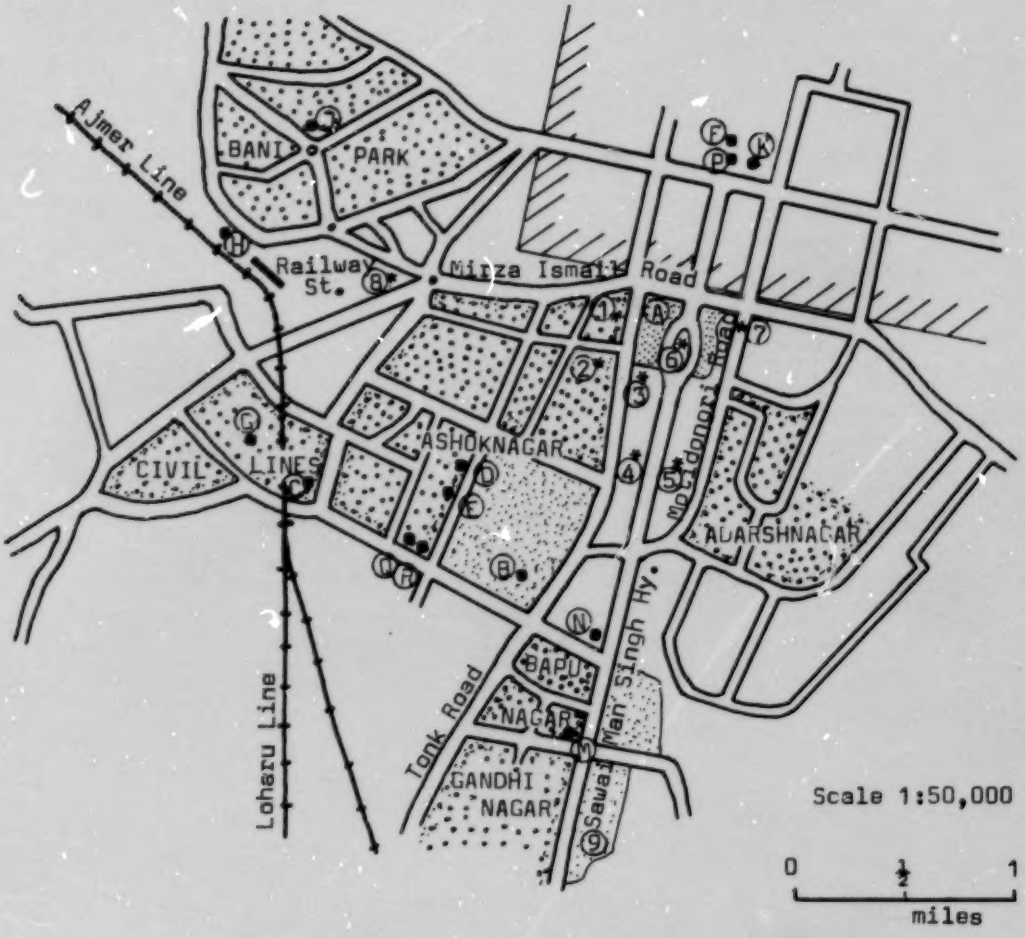
Initially, Jaipur was an outstanding success. Its population grew to 138,000 by 1870, and to 160,000 by 1901. In 1879 it was described as a major banking centre and money market for all Rajputana (C. A. Bayley, 1879) based on its trade in precious stones and metals. Gold was imported for a small mint which exported over 100,000 gold *mohurs* a year to the rest of India. Johri Bazaar (= Jeweller's Market) which culminated in Manak Chauk (= Ruby Square) was the centre of this activity, and wealth drained from Agra and Delhi as a result of its success. The strength of its markets in other products was also sufficiently notable to attract traders from all parts of India, and overseas links were established through the seaport of Surat, a precursor to Bombay.

Despite this commercial activity Jaipur never developed any industries of size, and there were few other activities of note until the modern period. Those that did exist were, as would be expected, cottage industries related to the growing trade activity, and included enamels and damascene work (decorated metal, usually with gold and silver from the mint which produced the purest gold and silver in India); gold and silver thread used in ceremonial saris, etc; and a great variety of cut synthetic, semi-precious and precious stones. For a long time Jaipur was regarded as one of the largest gem cutting centres in the world. Brass and marble work of all kinds; dyeing, dye manufacture and block making for printing on cotton cloth; hand-made paper; and lacquer work were also significant. Dyeing and block-printing are still important in the outlying areas today, notably in Sanganer and along the banks of the little Nandi River.

With the continuing development of the city plan by Jai Singh's successors a large force of builders, masons, stonecutters and stone carvers existed and were highly regarded for their skills.

A walled city is obviously at a disadvantage when it comes to expansion, and Europe abounds with examples of medieval walled cities suffocated by their walls. The simples answer is to move outside, and given the topographical setting it was not surprising that this occurred extensively to the south. The second half of the nineteenth century marked the first serious move outside (as opposed to settlement in existing villages and forts independent of the city) and followed the changeover to rule by the British Government in place of the East India Company after 1857. The British were no longer prepared to leave the princely states alone and various agents and garrisons were stationed throughout the Agency of Rajputana (the British name for Rajasthan), including Jaipur. In fact there had been a Political Agent in Jaipur since 1821 following a rebellion in the city the year before, and this post was maintained right up until 1947. The Residency this agent occupied was a palace just over a mile away from the south west corner of the city, built and used as an occasional residence by the wife of Jai Singh II. The Water Palace (Jal Mahal) in Lake Maota was another out-of-town building constructed for a similar purpose. Artillery and infantry lines are shown on the 1865 map (Plan, 1865) along the outer area of the southern wall and a *bazaar* stretches away from the Sanganer gate. The pattern of civil and military lines by now laid out so spaciously and quite independently of the city is clearly shown and reflects a feature common throughout occupied India, and which was to be so fundamental in the development of Delhi/New Delhi.

Simple as the expedient of expanding outside the walls appeared, it was in fact very destructive of the original socio-economic structure, which was, as explained, a centripetal one. The new demand for space expressed itself centrifugally and the leap-frogging of the wealthy and ruling



• Important Buildings and Institutions

- (A) Raniwas Gardens
- (B) Rambagh Palace and Estate
- (C) Residency (Raj Mahal)
- (D) Rajasthan Treasury
- (E) Rajasthan Secretariat
- (F) City Municipal Office
- (G) Chief Minister's Office (Raj Bhawan)
- (H) Railway Offices
- (J) Collectorate
- (K) Police Headquarters
- (M) Directorate of Education
- (N) Urban Improvement Trust
- (P) Unemployment Office
- (Q) Rajasthan Canal Office
- (R) Directorate of Agriculture

* Educational, Health and Cultural Institutions

- (1) M.G.D. Girls' School
- (2) Maharani's College
- (3) Maharaja's College
- (4) Sawai Man Singh Hospital
- (5) " " " Medical College
- (6) Albert Museum and Art Gallery
- (7) (Site of) Mayo Hospital
- (8) (Site of) United Presbyterian Mission Church
- (9) University Campus

Walled City

Named Residential Areas

Figure 5: Suburban Development in Jaipur

classes to the suburbs led to a dualism of old and new separated by a band of low-status housing and functions. Areas such as Brahampuri were entirely abandoned and this settlement is, today, in the words of Kohli "a deserted village presenting a ghastly and shoddy appearance", and what Indra Pal calls "a slum like village" (Kohli, no date; Indra Pal, 1968).

It was not long before the local rulers were mimicking the British and looking for residences outside the city, and the Rambagh Palace of Maharajah Ram Singh II was built, initially for guests, south of the city (see Figure 5). A spate of major buildings related to the civil presence of the British then followed, although many were actually built by the local rulers for them. Most notable of these was the Mayo Hospital in 1875, named after the Viceroy of India at the time; the United Presbyterian Mission Church in 1876; the Museum and Albert Hall in the Ramniwas Gardens in 1876, the gardens having been opened in 1868; and the Lady Willington Hospital, now the Sawai Man Singh Hospital and Medical College.

In 1932 some attempt was made to organize this disordered and spasmodic development by planning five new residential areas all of which turned out to be successful upper class settlements. They were: Ardarshnagar; Bapunagar/Gandinagar between the Motidongri and Tonk Roads; Ashoknagar; New Colony; and Bani Park (see Figure 5). New Colony and Ashoknagar were developed before the Second World War and Adarshnagar in the late 1940s prompted by the need to accommodate refugees from West Pakistan. The so-called Civil Lines is a small colony of bungalows built for government ministers when Jaipur was still independent, and Bapunagar and Gandhinagar were developed after 1948 for private and government employees on the site used for the Indian National Congress which was held in the city in 1948 (Indra Pal, 1968).

As the needs of commerce and administration placed greater demands on the city so people were forced out. Nearly all the first floors to the *bazaar* buildings which were once residential became offices; after Partition many refugees came to the city; rural migration and the natural increase were also high. Population growth in the city has therefore been extremely fast and it is unlikely that any established city could have withstood it:

Population increase:	1931-41	17%
	1941-51	65.4%
	1951-61	38.3%
	1961-71	58.1%

In 1971 the census population for the Jaipur urban area was given as 637,000, a fourfold increase in 70 years. The main axis of growth has been along either side of the road to the airport (Sawai Man Singh/Tonk Road) seven miles away, and following the example set by many of the ruling elite lots of the wealthy and their attendant traders have left the walled city. The two *chowkris* of Modhikhana and Visheswarji (divisions of the original single sector of Visheswarji split by Chaura Rasta after the construction of the New Gate), once the principal residential districts of the *marwaris* or rich merchant class, have been abandoned and their splendour largely destroyed as they became the homes of the poorer people. Little attempt has been made to retain the old structure, although it partially reappears when the wealthy families re-establish themselves around prestigious newer centres like the Rambagh Palace (now an hotel), and the Residency (or Raj Mahal) and adjacent Civil Lines.

The walled area is only partly the commercial and administrative centre for the same reasons, but the original areas have nevertheless expanded. All the *bazaars* are at least as busy as in the past, and for a long time the raised and shaded sidewalks were taken over by a variety of stalls. The specialist structure of the retailing also gave way in the face of increased demand for food stalls, and the Johri Bazaar (Jeweller's market) now has many vegetable and spice stalls among its other premises. The wholesale grain market previously located along Chandpol Bazaar was relocated outside the city wall and is now also given over to retailing. In addition the space left immediately inside the walls for troop movements have become market areas, such as the two already referred to near New Gate.

Outside the wall the main shopping area is along Mirza Ismail Road (the original Ajmer-Agra road) which runs parallel to the south wall as far as the railway station. There is nothing to distinguish this street from any other motor road in India, and with increased motor traffic it is a hot, dusty and generally unwelcoming place.

Ever since the days of the British presence the administration had been fleeing the city. At first developments outside the walls were largely for the provision of services lacking or inadequate inside, notably education, health and sport, but increasingly central facilities provided by the palace area, and also the law courts at Sanganer Gate, became superseded.

The city was of course only designed to administer the relatively small city state, and after the Reorganisation of the State in 1950 it was faced with the enormous task of overseeing the second largest state in India, over 132,000 square miles (larger than Great Britain) and containing a population of 25.7 million in 1971. Apart from the seat of the High Court which is located in Jodhpur, nearly all the major State offices had to be established in Jaipur. The main area chosen was close to the Rambagh Palace (see Figure 5) and the offices included the Secretariat, purpose built by the last ruling maharajah, Man Singh II; the Agricultural Directorate; the Rajasthan Canal Office; and the Central Government Accounts Office. Although this is a well laid out and attractive cluster, it could not contain all the necessary offices, and numerous others are scattered throughout the southern suburbs (see Figure 5) in either rented buildings or such others that could be built on vacant lots among the sprawl of other developments. The Directorate of Education; Urban Improvement Trust; Town Planning Office; and Railway Offices are examples. Nevertheless, the headquarters of some of the older services are still located in the walled city, such as the Police Headquarters, Employment Office, and Water Supply Office, as well as the City Municipal Office (Town Hall).

Jaipur had always been well endowed with schools and colleges, mainly due to the scholarly reputation of the founder, but also because of the lack of industry and the wealth of the merchants. The first college for higher education (Maharajah's College) was opened in 1844 and had 800 students by 1875. It was reputed to be the best in India and many schools, such as M.G.D. (girls' high school), and colleges draw students from all over India.

Apart from the Maharajah's High School, and the School of Art, 1868, originally located in the planned city, the educational institutions have developed along the Sawai Man Singh Highway, and these include the

university, established in 1947 two miles south of the city on a limited linear site. Only the earliest of these institutions, including M.G.D. and the relocated Maharajah's and Maharani's Colleges, have anything that can be called a campus, due to their sandwiching between the continually growing residential areas east and west of the highway.

As noted previously Jaipur has not become an industrial centre and only 18 per cent of its working population was classified as engaged in an industry in 1961. All the industry of note is therefore outside the walled area, and again development can be seen as distinctly related to two periods, that of the last quarter of the nineteenth century; and post-Independence. In the earlier period the arrival of the railway and its station, located about one mile from the Chand Pol, was the chief influence. Two steam cotton presses were located near to it in 1885, and a cotton ginning factory a little later. Little else happened until after Independence when a conscious effort to industrialize was madeand a government supported private venture led to a small estate being established adjacent to the railway line, and this, although still small, is the main industrial area today. Engineering workshops employed 1,693; spinning and weaving mills 1,012; metals and electrical industries 504 in 1961. A second estate was started in 1957 near the South Jaipur Railway Station mainly for small-scale units, and a third estate started in 1968 was located between the Ajmer and Loharu railway lines. This latter is intended for heavier industry including cement, chemicals, car parts, steel furniture and paper (Indra Pal, 1969).

In conclusion it would be fair to say that as a town planning venture Jaipur was initially a considerably success. It managed to provide a spatial framework within which the social customs and economic activity of a large population could function efficiently, and to this added considerable aesthetic character. The inability of the city to cope with subsequent developments should be seen in relation to the pace of change; the scale of change; and the changes of function. The rapidity of growth led to a lack of control and haphazard building. The scale of growth could not be accommodated within the existing structure, whether it was housing, retailing or administration. Finally, several new functions including industry, higher education and State administration were added.

That the original city has survived this onslaught is perhaps remarkable, and justifies the conclusion of a sound original plan that could have been stretched physically (though not socially) using an extension of the *chowkri* layout into the southern area. The width of the main roads was undoubtedly the key factor, for they traversed all areas of the walled city and could easily accommodate modern transport. This is no doubt fortuitous as Jai Singh II could have had no idea of the changes to come. He was however a maharajah and elephants were his mode of transport, especially on ceremonial occasions. He built on a grand scale and made certain that the streets were wide enough for both his processions and his elephants. (Gangauri Bazaar and Gate were actually named after the procession which passed through them annually.)

In addition to these physical stresses there was a cultural problem, the presence of an alien society which refused to integrate with the existing one and set up its own community outside it. Jaipur's later history certainly illustrates the importance of this and the impact of British settlement must not be underestimated, but nowhere was it to be expressed so forcefully as in and around India's greatest city, Delhi.

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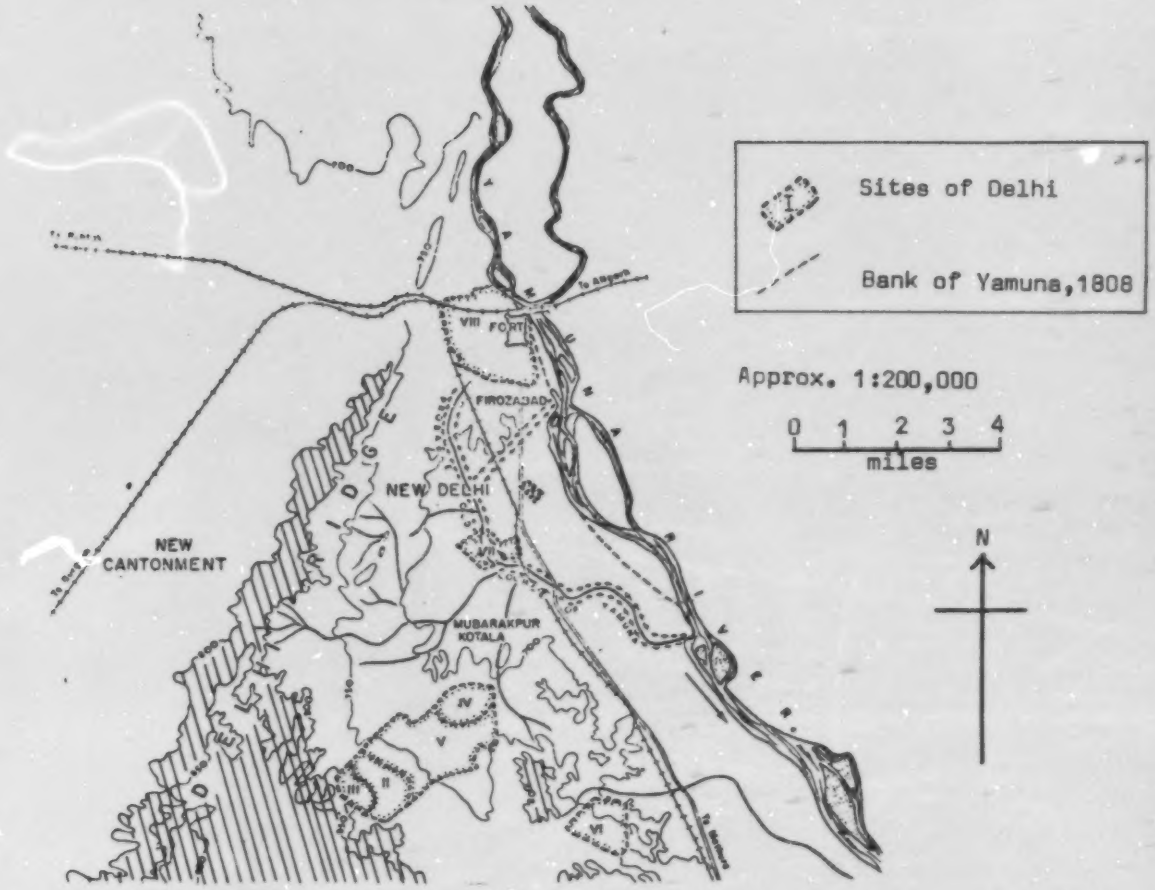

I Indraprastha- Purana Quila
II Quila-i-Rai Pithora
*III Lalkot - Qutab Minar
IV Siri
*V Jahan Panah
VI Tughlaqabad
VII Humayun Tomb - Delhi 'Sher Shah'
VIII Shahjahanabad ('Old Delhi')

(Author's Note: The above sites are those quoted by U.Singh, as it his map that is reproduced. However the choice of sites that genuinely reflect the position of past Delhis is by no means established, and this author does not include those marked *. III is included in II; V is omitted, and Firozabad, named on the map, is added. Reference should be made to the list on P.23.)

Figure 6: The sites of Ancient Delhi
(Reproduced with minor modifications from U. Singh, 1959, p.116)

NEW DELHI

Reflecting on the situation in Jaipur, a planned walled city overwhelmed by expansion in all sectors and growing unchecked and largely unplanned into a sprawling suburb to the south, it is hard not to draw some parallels with Delhi. Here, too, is an old walled city - Old Delhi or Shahjahanabad - equally unable to cope with the forces thrust on it, but in this case the expanded city was laid out and constructed without hindrance by the most reputed power in the field of town planning, and yet the result for the Indian people was on almost every count an unmitigated failure. Why? Perhaps the answer is again to be found in Kipling's verse:

"For the City and the Viceroy, as we see,
Don't agree."
[*A Tale of Two Cities*]

for in Delhi there had been the most profound example of continuous urban development by Hindu and Moslem rulers which culminated in the walled city, built between 1628 and 1648 over two-and-a-half square miles to house 60,000 people at a density of 48/acre, and with an abundance of open spaces, parks and gardens, and roads amply wide enough for the pedestrian and animal traffic of the time. Had the experience and energy of this creation been combined with the resources and authority of the colonizing power an entirely different picture would have emerged. As is known, however, the two cultures did not combine but chose rather to compete, and in such a situation it was hardly surprising that the result was to the detriment of Indian urban life.

As the concern is with New Delhi the details of the existing city usually known as (Old) Delhi today must be limited. The site had long been used because of its strategic position commanding the route into India from the north west, and lying on the watershed between the Indus and Ganges basins. To the north east lay the Himalayas, and to the south west the desert. Evidence for the sites of at least seven previous cities has been recorded (Hearn, 1928; U. Singh, 1959), all located in the region between the 60 feet high quartzite Delhi Ridge to the west, and the River Jamuna to the east, an area measuring about 5 miles by 11 miles but triangular in shape and tapering to the north.

The generally recognized ancient cities were (see Figure 6):

By Hindu Rulers (until 1173):

1. Indraprastha about 1400 BC. Also on this site between 700 and 1200 AD the first city to be named 'Delhi' was built, named after Raja Delhu or Dilla, but now Anglicized.

2. Qila-i-Rai Pithora about 1100 BC. It included the Lalklot Fort built in 1060, and is marked by the Qutab Minar* today, reputedly built out of the stone from 27 Hindu temples destroyed when the city was razed in 1199.

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*A 238 feet high structure of sandstone and marble regarded as one of the finest towers in the world.

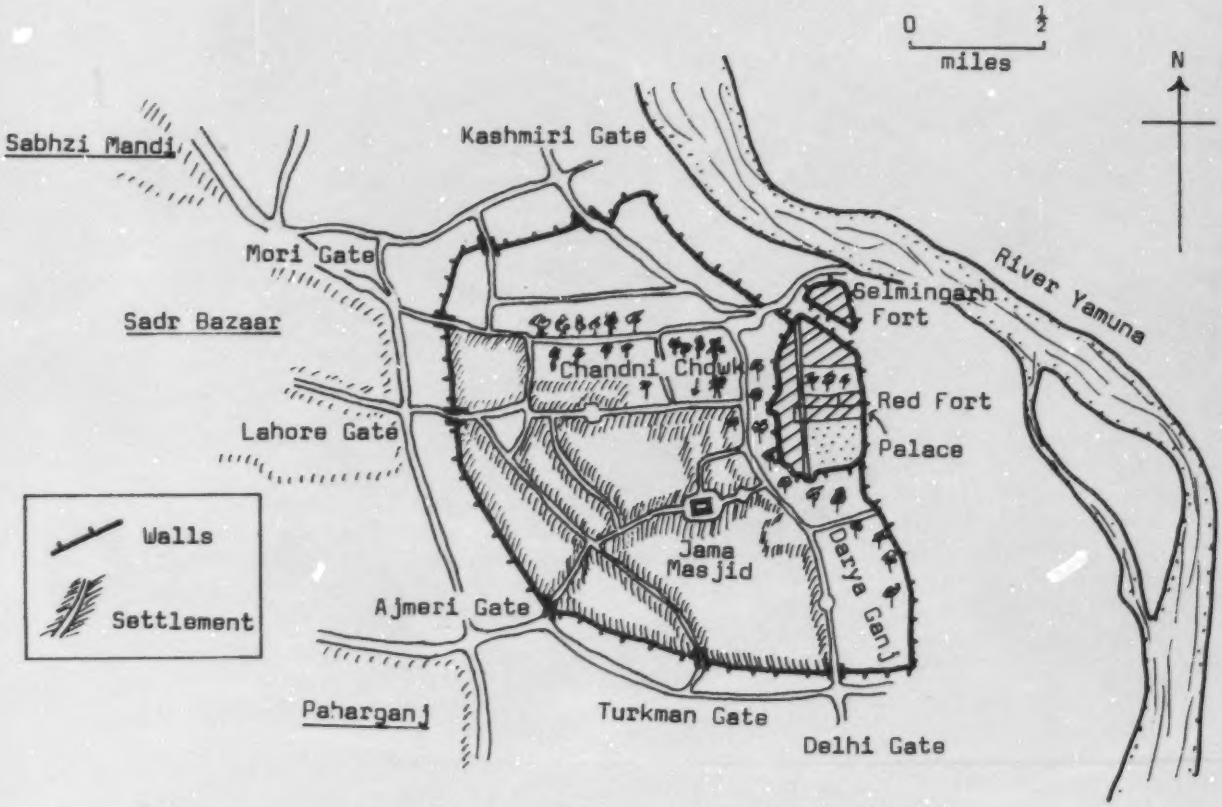

Figure 7: Plan of Delhi, 1857
(Based on U. Singh, 1959, with additions)

By Muslim Rulers (after 1173):

3. Siri in 1203, just north east of Rai Pithora.

4. Tughlaqabad in 1321, 3 miles south east of Siri.

5. Firozabad in 1334, located to the north.

6. Delhi 'Sher Shah' in 1545, in the south.

7. Old Delhi or Shahjahanabad in 1637.

Similarities with the later creation of Jai Singh II have been pointed out, but should not be laboured. Shahjahan was the Mogul emperor who built the Taj Mahal in Agra as his wife's tomb, and his Delhi creations were no less majestic. The Red Fort can be considered a walled palace and it was connected to the fort of Selimgarh by a bridge. In Jaipur the fort of Nahargarh played a similar role. To the rear of it was the River Jamuna, and west and south of it the walled town (see Figure 7) of which the main thoroughfare, Chandni Chowk (= Silver Street) led away from it towards the Lahore Gate. Although there was no formal geometrical layout the Moslem Mosque of Jama Masjid provided a focus for four main routes to the south of Chandni Chowk, and these divided the southern area into quadrants and left the city at the main gates. The five-and-a-half mile long wall, not removed until 1950, was pierced by 6 major gates mainly named after the towns their roads led to, namely: Kashmiri Gate; Mori Gate; Lahore Gate; Ajmeri Gate; Turkman Gate; and Delhi gate (this referred to an ancient 'Delhi' to the south of modern Delhi) - but there were some later and less important openings.

Because of its strategic significance Delhi had had mixed fortunes by the nineteenth century. Its population has been estimated at 130,000 in 1800 with another 150,000 outside the walled area (A. D. King, 1976), although a population of half a million is quoted by Thakore (in A. D. King, 1976) for the fourteenth century. Certainly it was a major commercial centre by 1800 and, more so than Jaipur, an industrial centre. As the name of its principal street, Chandni Chowk, indicates silverware and jewellery were important as were other craft products including ivory work, embroidery and wood carving.

The British, as in Jaipur, became prominent after 1857 when the Mutiny caused them to consolidate both their military and civil presence. But prior to that a military and civil settlement had developed, initially within the walled area. 1803 was the year the British captured the city from Mahratta forces, and as these and other groups such as had plagued Delhi and other cities in the Gangetic Plain for centuries were still a threat, the army established itself just inside the Kashmeri Gate and also in the south of the city at Darya Ganj (see Figure 7). The Kashmeri Gate area was to be the most durable of these locations, and monuments to the military, Victorian wrought iron work and other incidentals are still striking features of the neighbourhood.

However the British were clearly unhappy with their position within the city and by 1828 felt sufficiently secure to move both the civil and military communities (usually called 'lines') outside. In Delhi as elsewhere in India the division between the two communities spatially, and often culturally, was absolute.

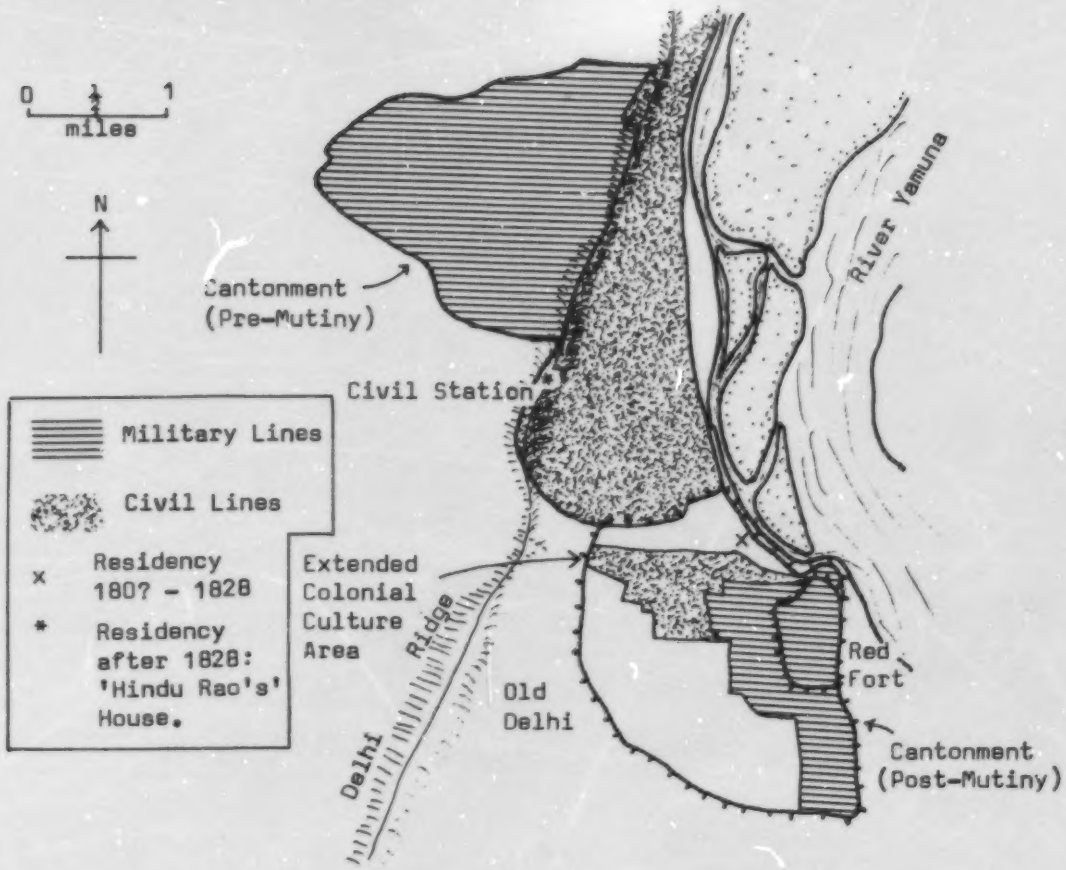

Figure 8: Delhi - after the Mutiny
(Based on A. D. King, 1976)

A military cantonement was located north of the city just over the ridge (see Figure 8) and laid out with a typical military capacity to consume space - their 1,500 acres was in fact greater than the entire enclosed city of Old Delhi! At the same time the crucial civilian pole of growth, the Residency, was built on top of the ridge (a previous Residency had been established in a sequestered palace near Kashmeri Gate, probably in 1812, and it was largely due to this that this area developed and retained its British population despite the suburban growth that followed) and this triggered a flight to the north, based on the area closest to Kashmeri Gate, but not actually adjacent to it, and spreading north between the river and the ridge. King suggests that it was "the mixture of fear, racial antipathy, social exclusiveness, and concern with health which characterized the colonial population" which led to this increasing physical segregation (A. D. King, 1976:203). It had not been so evident earlier in the century and much of it can be traced to the social habits of Victorian society in general, habits which matured early in India, and lingered long after they died in the Mother country.

It should be noted that inside the city the newcomers at first lived as neighbours with the indigenous population, and although spatially segregated from them this was to be expected in an immigrant community. Quite unlike the Mogul emperor who lived in his palace within the city, the British faced the Indians across what is now the Ansari Marg (= road) in Darya Ganj. But with the polarization of attitudes attendant on the strengthening of colonial power the cultural division was hardened. The suburbs did not develop as in the west in response to new transport technology or easier access in any way - they were simply the conscious expression of the colonial cultural preference. Communities like that of Darya Ganj soon died out completely, and social pressures within the colonial society were so strong that few would risk non-conformity.

As might be expected as Delhi had been a centre of the Mutiny, it was particularly affected by the aftermath. The Emperor who had been re-established by the mutineers was expelled and the British army installed in the Red Fort (and part of it is still used by the Indian army today). The population was also evicted from the entire walled area and the army stationed in a north-south zone stretching all the way from Kashmiri Gate to Delhi Gate, while a 500 yard wide perimeter around both the Red Fort and the city wall was completely cleared. The indigenous population suffered greatly, first from the many deaths following the Mutiny, secondly from the eviction and the resultant squalor they were forced to live in outside the city, and thirdly from the loss of the eastern third of the town when they were allowed to return. The Moghuls and other colonists prior to the British were hardly less harsh when fighting, but their subsequent administrations had always been of a rather supervisory nature demanding cooperation rather than conformity. The Hindu ethic is fundamentally one of tolerance, and this allowed the Hindu to accept the Moslem and live with him in Old Delhi. The British demanded much more and tried to Anglicize and westernize the Indian to an unacceptable degree. Indeed, the Mutiny was very much a response to these pressures and was a reflection of feelings throughout Indian society rather than just in the Indian army. Delhi today is once again a city of many religions, perhaps not in harmony, but at least tolerating each other. The structure imposed by the British following the Mutiny entirely prohibited any form of cohesion.

As the military moved in so the the civilians moved out and the northern suburbs became their domain, as did the western ones of Poharganj, Sadr Bazaar, and Sabzi Mandi for the Indians (see Figure 7). The British popula-

tion prior to the Mutiny had been small, estimated at about 300. Now it was enlarged, probably reaching 1500 by 1881 (about 1,000 civil, 500 military) while the native population suffered a loss of about 20,000 resulting in a fall in population from 160,300 in 1847 to 154,400 in 1868 (A.D. King, 1976) after reaching a nadir of 141,700 in 1863.

Apart from the physical changes a programme of Anglicization was now undertaken with renewed vigour, such as through the building of imposing institutions and monuments representing the authority of the colonists, for example the Delhi Institute in Chandni Chowk in 1864 and even more symbolic the Victoria Clock Tower also in Chandni Chowk in 1873. Lahore Gate was renamed Victoria Gate, and Delhi Gate became Alexandra Gate.

The next impact was that of the railway and this did mark an influence that was technological rather than cultural, although the railway came to be both in the end, in Britain no less than in India. The physical presence of the railway was obvious, but it did not seem to significantly affect land use or the later development of New Delhi. The natural avenues it occupied were the cleared areas outside the walls, and the entrances through the walls, notably at Calcutta and Kabul Gates (see Figure 10), were cleared. The main effect was to reduce to about half the area of the walled city now available to the Indian population. The first line arrived in 1862 and the system was expanded into the twentieth century, the main phase culminating with the line to Agra finished in 1906.

The railways did however pave the way towards making Delhi the national capital, for with the takeover of power by the British government the country was ruled politically as a single nation. In practice the technology of the nineteenth century did not allow the centralization of power in a national capital, and the port of Calcutta had been the capital as it provided the main point of contact with London. With the advent of the railways, the telegraph and the telephone, and even air services, the feasibility of a centrally located national capital was apparent and the decision was taken to move to Delhi in 1911, and a new city, New Delhi, was to be built to accommodate it.

So far, by a mixture of conscious and unconscious effort, the development of Delhi had been controlled. The old walled city still retained its walls - their military significance gone they nevertheless remained until the British went, part of the *"cordon sanitaire"* as King puts it (A. D. King, 1976). The western half of Old Delhi and the adjacent western suburbs were given over to the native population. To the north lay the by no means haphazard area of colonial settlement, and north west of it was the military encampment.

Two events are illuminating in understanding the British attitude towards the new city. In 1911 a *Durbar* was held. In effect this was a grand pageant, borrowed from Indian custom, used to impress upon the Indian population the might of their rulers. In particular it was the *"visual* symbol both of the presence and the power of the ruler and not least, of his continued existence" (A. D. King, 1976:223).

The scale of the *Durbar* must seem astonishing to those not familiar with it. £1,000,000 was allocated, and the review ground had seating for 100,000. Forty miles of new roads were built and 35 miles of railway plus a railway station with 10 platforms! Accommodation was provided for 250,000 people or the equivalent population of Old Delhi, but on a site five times as big (situated in the north west by the military cantonment).

Clearly, if they were to go to such lengths to merely display power the new city which was to administer it would have to be the epitome of authority. Indeed, Herbert Baker, Lutyens' associate (Edwin Lutyens was appointed chief architect in 1912) summed it up when he wrote that: ".... It must not be Indian, nor English, nor Roman, but it must be Imperial. In 2,000 years there must be an Imperial Lutyens tradition in Indian architecture.... Hurrah for despotism!" (Hussey, 1950:247, quoted in Stamp, 1981). In reality the British set out to build not a city, but a monumental and majestic parliamentary enclave spread over some 33 square miles of the Delhi Plain.

At this stage it is worth considering something of the background to town planning in India, and of the individuals responsible for creating New Delhi.

According to Whittick (1976), the first responsible steps towards formal planning developed in the Presidency towns of Madras, Bombay and Calcutta in the mid-nineteenth century. Subsequently, 'town planning' was a municipal function largely concerned with sanitary engineering, water provision, and institutional health measures. With expansion and the need for additional housing the local authorities were found inadequate and 'improvement trusts' were established, such as in Delhi in 1937, although the earliest examples were at the turn of the century. These, too, had a limited sphere of operations and largely concerned themselves with suburban developments in profitable areas, and generally neglected urban renewal which would have been less rewarding financially. As a result planning for complete towns and cities was rarely considered and the two active bodies were largely hampering each other, for the municipal authorities were left with the task of maintaining services on a piecemeal basis, while the improvement trusts carried on virtually regardless of the existing built-up area and its needs.

The folly of these ways was made clear following the visit in 1915 of Patrick Geddes, the pioneer British town planner, to advise on redevelopment in Madras Province. For the first time town planning in India was considered in its entirety and Geddes' maxim of 'Folk-Work-Place' summed up his concern to plan for the people. He particularly warned against patchwork development and the trappings of planning like wide streets, and the provision of parks without reference to the economic, social and aesthetic needs and aspirations of the population. Although some fine industrial towns were laid out, notably Jamshedpur, started in 1907 in conjunction with the Tata Iron and Steel Company's operations in Bihar, these exhortations were largely ignored, and nowhere more so than in New Delhi, recently quoted in *The Indian Architect* (1977), "as an example of what not to do in town planning".

The responsibility for the design of New Delhi is credited to Edwin Lutyens and Herbert Baker, two architects largely noted for their designs of large houses for wealthy people, although Baker had been involved in colonial urban development in Africa, and notably the Union government buildings in Pretoria.

It is apparent that the concepts of modern 'garden city' planning as propounded and practiced in Britain at this time were quite absent, and in addition that the function of a town planner *per se* was confused with that of an architect. In retrospect it would appear that Lutyens and Baker were somewhat inexperienced for the job in hand, although to be charitable much of the design was outside their control and they probably met the required objectives. Unfortunately, the objectives were unsympathetic and inappropriate for the urban needs of the situation and they were neither able to recognize nor to remedy this.

In addition to the questionable choice of architects/planners, the seemingly cavalier attitude of the choice of site is a further indication of the prevailing mood. It was finally decided to locate the new city in the southern and unsettled area (apart from a few villages) rather than to cross the river or extend the already built-up northern area, despite the fact that King George V had already laid the foundation stone there. This in itself seemed a logical choice as much of the area north of the junction of the ridge and River Jamuna, and in the east adjacent to the river and south of Old Delhi, was liable to flood in four monsoons out of ten to a depth of about five feet of water (U. Singh, 1959). The eastern shore of the river was also vulnerable. The Jamuna has shown a continued tendency to change its course towards the east - it originally flowed beneath the eastern wall of the Red Fort (see Figure 6). Further north west, although higher, the ground was ill-drained and still contains swampy areas today, mainly because the impervious ridge prevents drainage towards the river. The 1978 floods clearly demonstrated these problems when it was precisely these areas, now occupied by Delhi University and a variety of post-Independent colonies such as Model Town, Gandhi Nagar, and Friends Colony, that were so severely inundated. Problems of health and sanitation therefore mitigated against these outer zones and Delhi is still notorious for its malaria - 15,000 cases a week being reported in July 1978 (*The Times of India*, 1978 (25 July)), with a total of over 209,000 since the beginning of that year.

Immediately west of the ridge the situation was better. In the north this was occupied by the cantonement and to the south by the same cantonement when it was re-sited. It would seem that the degree of separation from Old Delhi was too great here, and presumably the distance would lessen the impact. In the end the site chosen had good access to the old city, good drainage, and historical antecedents. Room to the south would allow later extension of the built-up area, although this was not a stated factor, and the plan did not in fact make such provisions for the future.

The stage had thus been reached where it was just a matter of locating the viceregal palace ('Government House'), the fulcrum of Lutyens' plan, and this was not in the end a choice to be left to planners or architects, although this had been the intention (see *Delhi Town Planning Committee*, 1913). Viceroy Hardinge himself rode to the area, rejected out of hand the proposed site as being hot, cramped and without a view, and in his own words: "I then mounted and galloped over the plain to a hill some distance away. From the top of the hill there was a magnificent view embracing Old Delhi .... I said at once .... "This is the site for Government House"." (quoted in King, 1976:235). Basically, this was agreed, and the location was admittedly appropriate being a minor spur of the Delhi Ridge known as Raisina Hill, and standing 50 feet above the plain (the top 20 feet was in fact blasted away to provide a level and larger surface), but it did illustrate what and who the planning was for.

The relationship of the new city to Old Delhi faithfully replicated the motives behind the original settlement in the north. It was well separated from the old, and in fact a 'green belt' principle prevailed except where Indian quarters in the new city were allowed to expand towards Old Delhi. Behind the civil area and west of it was the new military cantonment, precisely reflecting the position of the older one 'over the Ridge' in the north.

The actual layout of the civil area was a mixture of European planning symmetry contrived to fit imperial requirements, presumably seeking the

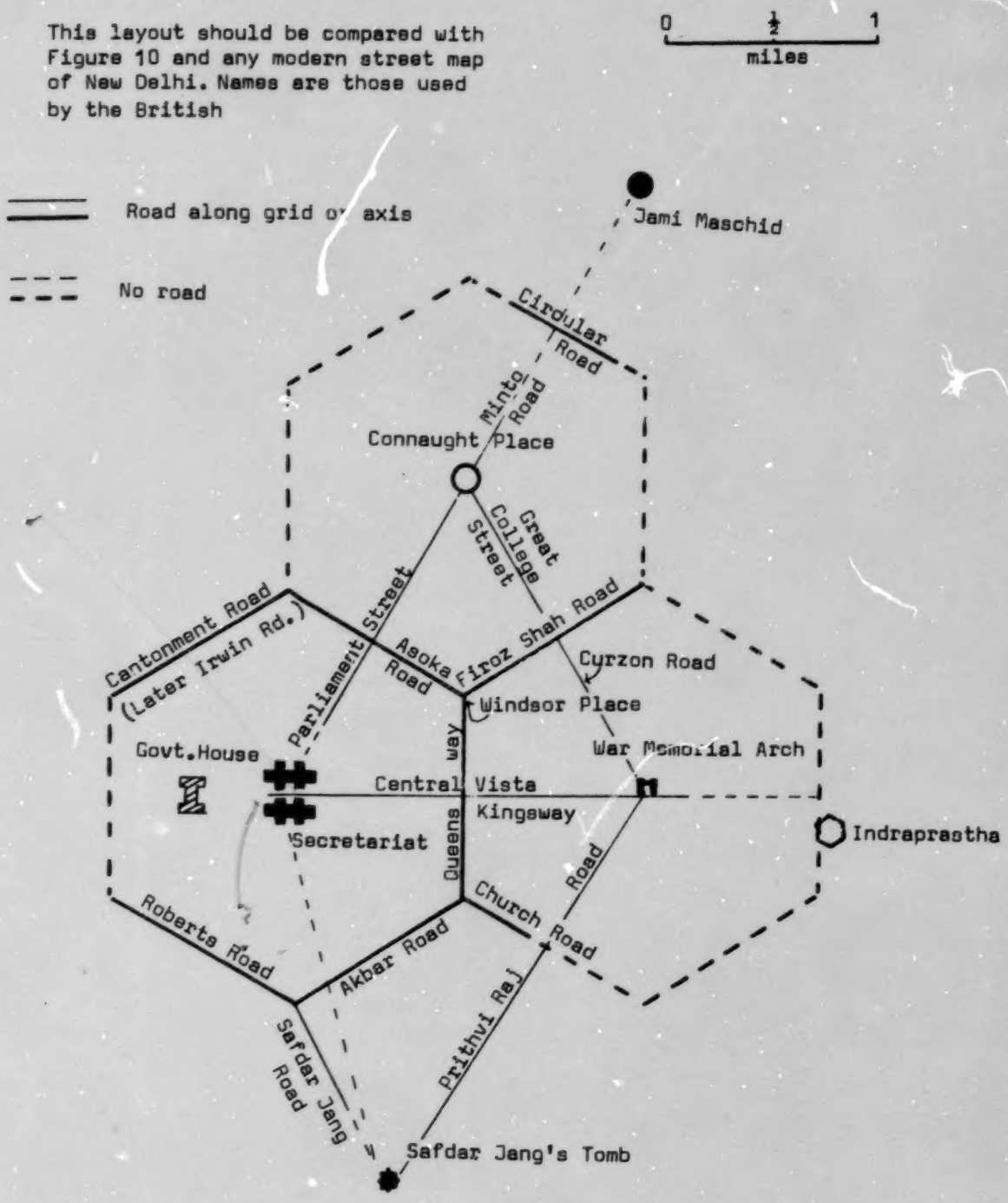

Figure 9: New Delhi's hexagonal grid

grandeur of scale found in straight lines, massive buldings and long vistas, as at Versailles, and it has been suggested that Lutyens was influenced by P. C. L'Enfant's plan for Washington D.C. and even Wren's for London. Although it is not immediately apparent the plan was developed from three hexagons with Government House, Connaught Circus and War Memorial Arch (now India Gate) at the centres. There was also a symbolic axial alignment from Government House to the Moslem Mosque in Old Delhi; to the ancient site of Delhi called Indraprashtra; and to the Tomb of Safdar Jang (see Figure 9). Nevertheless any functional associations that this structure might be supposed to support were non-existent, it being no more than a facade decorating but not complementing the proposed land use. Indeed, as Bose (1974), says "the gap between rhetoric and reality is great in New Delhi".

In detail the planning is so different from that of either Jaipur or Chandigarh it is difficult to pick up the fundamental physical differences from the wealth of symptomatic ones, but perhaps if Lynch's taxonomy for the perception of urban areas is used (K. Lynch, 1960)*, it can be seen that while Jaipur and Chandigarh were focussed on *districts*, divided and serviced by *paths* in Jaipur, or separated by *edges* as in Chandigarh, New Delhi depended on *nodes* and *landmarks* linked by *paths*. Living space represented by *districts*, was distinctly subservient and the residential areas for the highest ranks of society seem to be more a collection of *nodes* than *districts*, so imposing and isolated from any sense of community were they. This looseness of layout can partly be attributed to the anticipation of motorized transport, but this has only become a reality in the present decade, 50 years on from the original plan, and as Delhi is fairly unique in its high degree of car use this might in fact be said to have been generated by the plan from sheer necessity!

The planned population for New Delhi was very low, a mere 30,000 plus dependents, later increased to 65,000, spread over 32 square miles. As dependents were limited it is reasonable to assume 125,000 to be the maximum envisaged, a density of only 6/acre! Densities in some wards of Old Delhi now exceed 1,000/acre!

The prime function of New Delhi was political and administrative, and of necessity, but secondarily, residential. Industry was never entertained and is virtually absent even today. Indians in practice were a very limited part of the political scene, and only the native princes were accommodated. In the administrative field it was reluctantly recognized that there were not enough Europeans to do the clerical jobs and so provision had to be made for housing indigenous clerks. No thought was given at all to housing for the lowest paid workers, the sweepers and such like - *peons* - who though universally employed by everyone in power were presumably expected to vacate the city when their day's work was done.

On this basis an explanation of the residential layout can be attempted. It was formal, not functional, and the social axiom that 'everyone knows their place' has never been more systematically translated into spatial

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*In his book, *Image of the city*, Kevin Lynch summed up the perceived elements of a city under five headings:

1. *Paths* - Channels along which the observer moves.
2. *Edges* - Features acting as barriers to movement.
3. *Districts* - Medium to large sections of a city having a degree of uniformity.
4. *Nodes* - Strategic points acting as focii, which can be entered into, e.g. station.
5. *Landmarks* - Point references that are well known, but can only be seen, e.g. statue.

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Figure 10: Residential allocation in New Delhi
(After A. D. King, 1976)

reality. In Jaipur it was noted how proximity to the centre was related to status, giving a gradient of caste downwards from the palace area. This did not over-ride the function of the city or its districts, but in New Delhi the process was carried to its ultimate extreme, based on the 'Warrant of Precedence', a sort of social bible which ranked 175 civil and military posts from the Governor-General down. All other non-official positions also had some understood hierarchy. Superimposed on this was race. Thus housing was assigned according to rank in the scale of Precedence, and apart from the obvious differences in house style, size, plot and various facilities, of great geographical significance was the weighting given to distance from Government House, and the width of the road serving it. On the map the naming system, which was also ranked, is indicative of the status of the residences in that road.

The highest order was that of Members of Council and these were assigned spacious quarters either side of Kingsway (see Figure 10). The Governor/Viceroy overlooked the Secretariat and Kingsway, and was flanked on his right by the Commander-in-Chief's quarters, and on the left by the Anglican church. Senior officers had large bungalows on 2-4 acre plots in the hexagon around the state buildings, and were balanced at the other end of Kingsway by the palaces of the Indian elite laid out around the War Memorial Arch.

Housing for the English and other Indian clerks was significantly placed outside the three hexagons, and closest to the western indigenous suburbs, and indeed demand for more room soon caused them to join up when it was eventually realised that housing for the *peon* class would also have to be provided. This almost total neglect of the poorest but most ubiquitous class in India has always been a serious problem, as any building, however humble, which is designed for him immediately assumes a value well beyond his means. Maxwell Fry, architect of much of the housing in Chandigarh, had this to say when challenged on the same point:

> "That we neglected the poorest paid people is quite true. The fact is that when we got on the job we were faced with the project estimate .... that had to be our bible .... When we began to move about we realised that there were vast masses of people who were not included in the project estimate, and we tried to make provision for them, but in a certain sense we failed. There was no economy upon which we could do it, even with the smallest house." [M. Fry, 1955:94]

In New Delhi a *peon's* was valued at 500 rupees (about £38), a council member's at 89,000 rupees (about £6,700) a ratio of 1:178. The scale of costs in Chandigarh was from 2,000 rupees to 91,000 rupees, a ratio of 1:46. Today in 1978, a typical price for land in New Delhi is 500 rupees (now worth about £30) per square yard, although six miles out from Connaught Place it could be bought for 16 rupees (about £1) in the 1950s. As a result the cheapest plot costs about 4,000 rupees (about £235) and the cheapest flat about 7,500 rupees (about £400) (V. K. Dethe, 1978).

That road and district names should have a ranking appropriate to their residents' status was a logical reinforcement of the hierarchical system, but psychologically the naming of the main thoroughfares of Old and New Delhi after an enormous range of British people, so forcing the Indian population to think and say every day names associated with their

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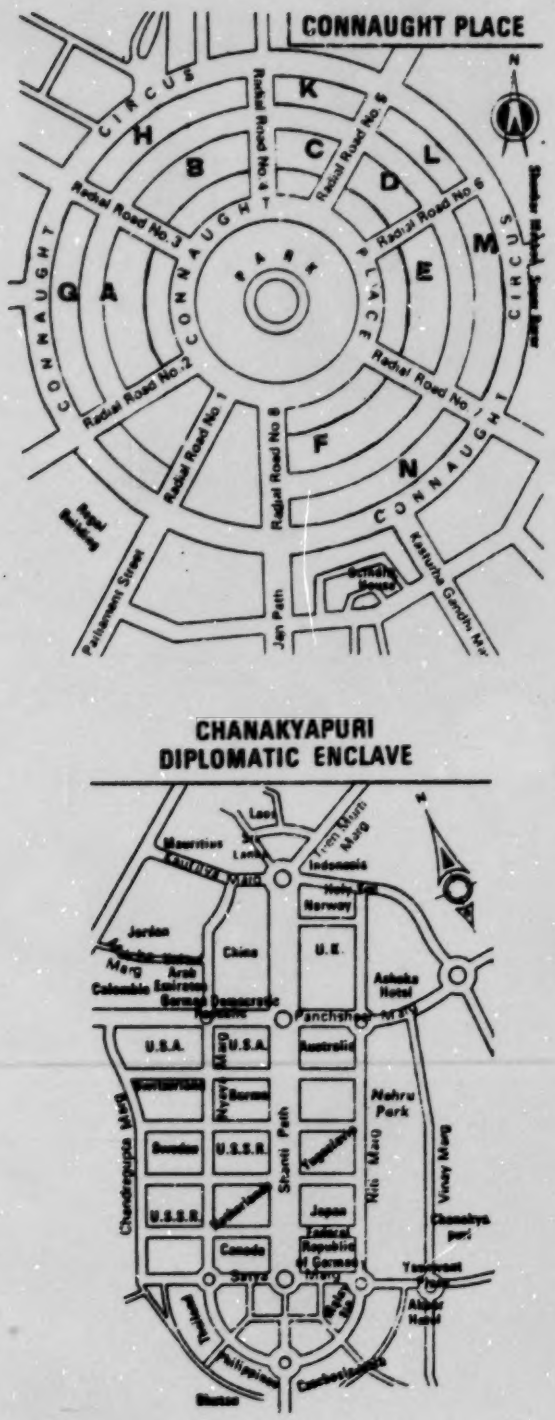

Figure 10a: Connaught Circus and Chanakyapuri

colonizers, had a far deeper significance in maintaining an awareness of the presence and power of the government. Following King (1976), the ranking was as follows:

1.	The Royal Family	e.g. Kingsway, Queen Victoria Road.
2.	Royal Palaces	e.g. Connaught Circus, Windsor Place.
3.	Leading civil and military personnel in Indian colonial history	e.g. Clive Road, Hastings Road.
4.	Indigenous rulers	e.g. Akbar Road, Jai Singh Road.
5.	Eminent political and social figures in India	e.g. Canning Road, Lady Hardinge Road.
6.	Fersons connected with the administrative and physical development	e.g. Lutyens' Road, Hailey Road (minor roads).
7.	Currently active military figures	e.g. Allenby Road, French Square (clerks' quarters).
8.	Functional names	e.g. Cantonement Road, Race Course Road.
9.	Topographical and other names	e.g. Upper Ridge Road.

Some 150 streets in Old and New Delhi were named in this way (A. D. King, 1976) and great confusion has resulted since the renaming of many of them after Independence.*

Most of the residential area was completed by 1925 and 3,000 civil servants could be housed. In the interim period the civil lines north of the old city had been adapted as a temporary capital and some important additions were made to it, notably a large secretariat in 1912. The facilities laid out for the *Durbar* were also put to use, and a Government House was created in the building used to house the King Emperor, while clerks were housed in the various barracks and tent cities of the main *Durbar* area. These were again brought into use at the time of Partition to house the enormous influx of refugees from Pakistan, and more recently they have been squatted in by the poorest classes.

It should also be clear that housing was not a priority in any intrinsic sense. The only area with realistic densities was tucked away in a corner of the plan. There was neither room in the planned area, nor adjacent to it bearing in mind the 'green belt', to provide more housing. Even the present Diplomatic Enclave (Chanakyapuri) south west of Government House and in a complimentary position to the clerk's quarters (see Figure 10a), was not in the original plan. Given the enormous pressures on Delhi since Independence it is perhaps surprising that the Enclave, which is so redolent of the original scheme, should have materialized at all. While strictures on space in all areas of Delhi have led to much vertical development, the Diplomatic Enclave was laid out on the most lavish scale,

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*Some examples of renaming are:

War Memorial Arch = India Gate; Kingsway = Rajpath; Clive Road = Thyagaraja Marg; Queen Victoria Road = Dr. Rajendra Prasad Road; Curzon Road/Great College Street = Kasturba Gandhi Marg; Government House = Rashtrapati Bhavan; Queen's Garden (Old Delhi) = Mahatma Gandhi Park; Connaught Circus = India Chowk.

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Figure 10b: The suburbs of New Delhi
(From *The tourist map of New Delhi*, 1976)

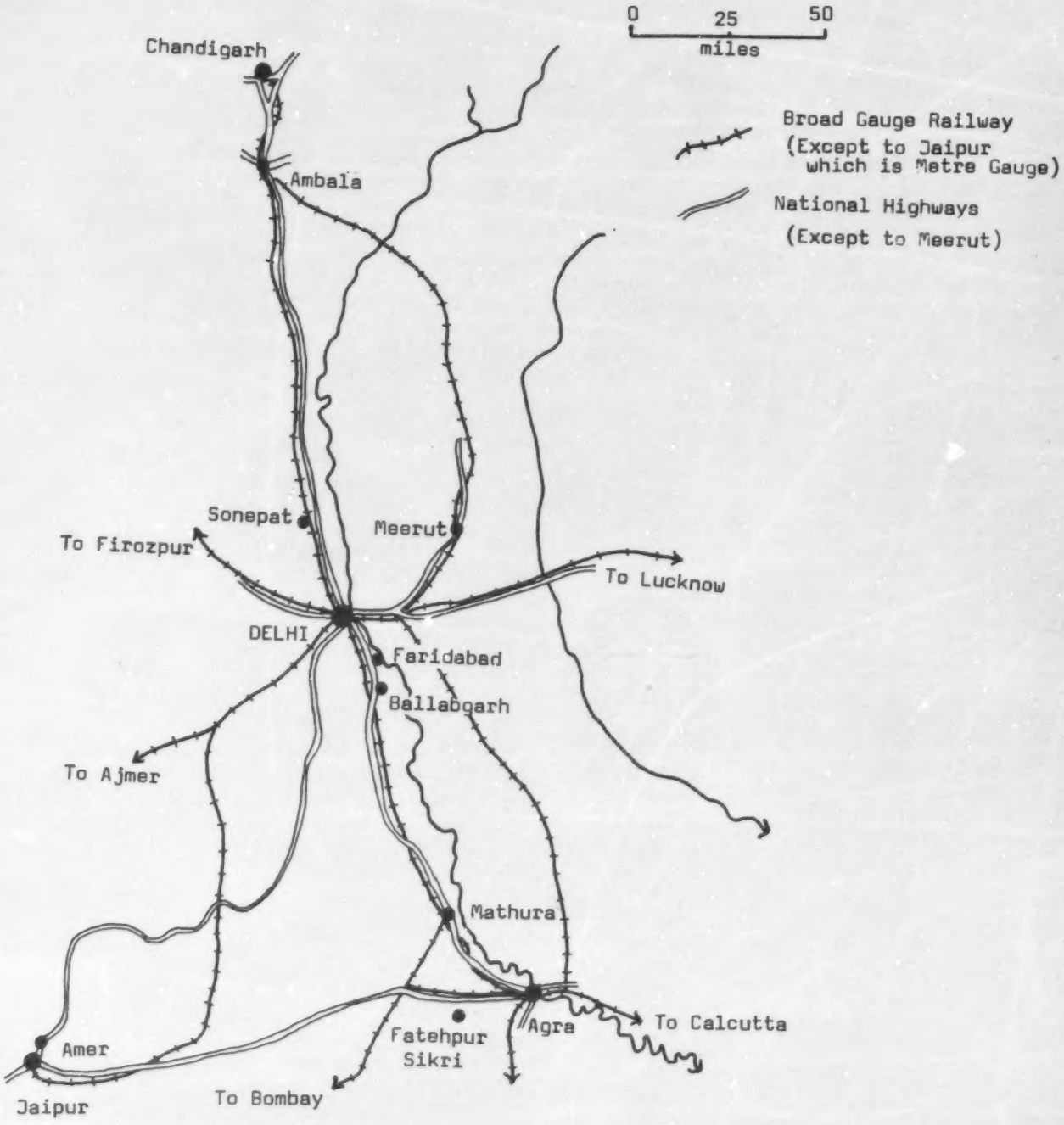

Figure 11: Environs of Delhi

with some missions having as much as eight acres of land, unquestionably the most generous allocation for any major city in the world. Not surprisingly this ostentatious use of land has its present day critics: "very loosely built expensive buildings, well kept and vast gardens, a totally out of proportion road system that has small relation to the life that reverberates in the area" (*The Indian Architect*, 1976). It is difficult to escape the conclusion that the successors to the British have often been just as thoughtless.

Of all the problems faced, housing is by far the most serious. Even the areas provided for in the plan were of poor standard and congested. The typical clerk accommodation wasted space by placing small dwellings in terraces around large squares. These had for the main one storey, one room, and communal facilities. No provision was made for expansion, an unforgiveable omission, and by the mid-1950s half a million people lived in slums and another quarter of a million were squatters spread out over some 500 unauthorized colonies on the outskirts of the city. Sixty-nine per cent of the dwellings had only one room (including all parts of Delhi) compared with an average of 44 per cent for all India, and over 65 per cent had neither kitchen nor toilet (*Town Planning Organisation*, 1962). While densities today rarely exceed 100/acre in New Delhi, they often exceed 1000/acre in Old Delhi. Everywhere in 1978 medium rise apartments are under construction - 'Houses for civil servants' is the universal explanation. And yet only 20 per cent of the population earn enough to buy the cheapest accommodation unaided. Only 12 per cent of the plots handled by the Delhi Development Authority have been sold to the lowest income group despite a policy of setting aside 50 per cent of their plots for this group. This largely reflects the insatiable demand from the higher income groups and a waiting list of 27,000 for flats ranging in price from 7,500 rupees to 80,000 rupees. There are in fact few flats available at the lowest price, and a current self-financing scheme is only concerned with those in the 60,000 to 125,000 rupees (about £3,530 to £7,350) range (V. K. Dethe, 1978). Houses are virtually banned and Housing Societies may only form for the purpose of multi-storey construction in areas that are miles away from the places of work. As a result a unique reversal of the normal pattern of densities and building heights has taken place and is continuing, for whereas high-rise developments and high densities are normally associated with central areas, the opposite has been the case in New Delhi, and possibly nothing else better expresses the differences in the aims of those who founded the city and those who use it.

It would be unfair to suggest that New Delhi has had anything like a normal pattern of growth, however, and it has particularly suffered from the flood of refugees from Pakistan; from its greatly enhanced importance as the national capital; and from the considerable resultant expansion of government related commercial and industrial activities. The current Master Plan for Delhi, completed in 1961, foresees a population of 5 million by 1987. It is thus true that much has been forced on this city over which few had control, but with a little justifiable foresight many of the present difficulties could have been limited in their effect.

Some welcome relief has been provided by the outlying towns, notably Faridabad, on the Agra Road, (see Figure 11) 16 miles south from Delhi, which has become a major industrial complex planned to house 300, 000 by 1981. Meerut in the north east, Ballabhgarh in the south, and Sonepat in the north, all within a 40 mile radius, have also developed as secondary centres and relieve the pressure on the capital. The Master Plan en-

visages connections by rapid transport systems, and also the provision of work centres located on the ring roads so as to be nearer to the newer housing areas.

As with housing so with the attendant domestic services. The retail services needed by the average Indian family were invariably related to essentials, and given the poverty of the market there was little support for large stores. As this resulted in the purchase of small quantities at frequent intervals the demand was for a lot of small shops well distributed in the housing areas, a feature in fact typical of any traditional Indian community. In Jaipur every major street, and many of the others, were *bazaars*. But by assuming a motorized transport system, and by planning for a very restricted class and social structure, such retailing as was provided at Connaught Circus was totally inappropriate.

In the first place it was based on the British 'city centre' concept and centralized away from the housing. Secondly, rich people did not have to do their own shopping, and thirdly, the colonial society had a very restricted social structure anyway, with few women, children or elderly people. Those in service were fit young bachelors for the most part, and when families were together in India they were usually split up between the areas of work such as Delhi, and the centres of education, culture and recreation as provided by the hill stations such as Simla in the case of Delhi. There was thus little demand for retailing and the colonial society itself tended to use the shops and services of Old Delhi. Connaught Circus was laid out on the grand scale and was perhaps an attempt to create a Central Business District, or more likely replicate the typical English shopping centre. It was far from compact with the most accessible central area being a park, or more realistically an outsize traffic roundabout, and its name 'Circus' is quite informative. As a result the shopper on foot had to walk long distances, became easily disoriented by the lack of a focus other than the centre (there are eight radial roads all with the same point of reference at the centre, and three concentric ones) and was forever crossing wide streets. With the advent of increased motor traffic in the 1970s, getting across the roads became an even more hazardous and time consuming process. Shopping in the monsoon rains was an equally miserable experience. As traffic arteries the benefit of the width of the roads was largely lost because of the frequency of junctions and convergence of routes, and a phase of multi-storey property building in the 1950s led to such chaos that all such building has now been banned. Most Indian commentators on the issue of Connaught Circus feel that 're-entry' - starting again from scratch - will be the only solution; "The man or body of men is not born who can plan Connaught Circus without the land being a clean slate, shorn of buildings ...." (*The Indian Architect*, 1978) (see Figure 10a).

There were a few other shopping areas, mainly spontaneous developments associated with the clerks' quarters, as at Baird Road and Gole Market (see Figure 10).

For much the same reasons other servies were largely absent. Education had no market in New Delhi, with the children in the hills or sent home to Britain - only 134 European children were recorded as resident in Delhi in 1932. The university stayed to the north of the city in borrowed premises, and in New Delhi there were only three institutes: a modern preparatory school and two ladies' medical colleges. Hospitals were just as limited and even today there are only four, including the original two provided for in the plan, one of these being the Lady Hardinge

Hospital which also included one of the ladies' medical colleges already mentioned.

This was clearly adequate for the ruling elite who went away to have their children and went home when they got old. On the other hand, there was an over-abundance of sporting and recreational facilities of great variety and consuming vast acreages in the south. The horse was the dominant recreational medium and to provide for it large areas of forest on the ridge were protected, and riding, hunting and horse shows were universal activities, with a more formal tone set in the provisions for horse racing and polo. Golf, cricket, tennis and swimming clubs with an invariably selective membership system prevailed. Most of these areas and institutions remain today but in a somewhat shrunken form. Between and south of them (see Figure 10b) have been added the many new housing areas - colonies - built since Independence, such as Lodi Estate and Lodi Colony, Defence Colony, and New Delhi South Extension Parts 1 and 2, with a related shopping centre. This margin, and all the rest of the built up area, has been subject to a continuous but patchy process of accretion. Colony after colony has been laid out, initially in isolation, but soon swamped by a tide of infill. Whatever facilities that were provided have also been swamped, over-used or by-passed. New Delhi has provided nothing capable of expansion, for the only planned area was for a static number of privileged officers. Those who own cars in New Delhi today probably live close enough to walk to work in the banks, embassies, offices, hotels and official institutions around Parliament Street or in Connaught Circus, but the poor who cannot even afford bicycles have to live on the outskirts. The present administration, with much justification, refuses to allow squatting and shanty development in the open spaces, but this only relegates it to the periphery, and the arcades of Connaught Circus and elsewhere are, as a result, the nightly abode of tens of thousands of pavement dwellers.

The Town Planning Organisation in 1962 (*Town Planning Organisation*, 1962) reported a deficit of 110,000 houses, 382 primary and 44 secondary schools, and 10 large hospitals. The majority of Delhi's water supply is polluted and intermittent, but because the British laid out a quite separate irrigation system for the open spaces of New Delhi the parks are always green and the fountains always flowing. The original housing of New Delhi is the exclusive preserve of embassy staff, foreign experts, private company personnel, and senior government staff, in all except the peripheral areas. Guest houses, private companies, banks, airlines, government and quasi-government offices, and hotels (notably Akbar, Ashoka, and Oberoi Intercontinental) have supplanted the rest.

To many New Delhi is an obstacle separating them from Old Delhi. Even for those who work in it there is no railway station, the railway lines being well clear of the planned area. However much one mourns the loss of such an opportunity to provide India with a fitting monument to western urban technology, it is nevertheless a fact that New Delhi is little more than a spatial anachronism in the average citizen's life. Indeed, for the most part it is treated as an historic spectacle, displayed to the tourist along with the tombs and ruins of the past, and like them devoid of a normal life. Only the roads really serve the population, and then it is only to take them through the city as quickly as possible.

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CHANDIGARH

There is much that is different and unique about Chandigarh, but its origins rather than its character are probably the most fundamental when considering its value to Indian society.

Primarily it was born out of necessity. After Partition the capital of the Punjab, Lahore, lay on the Pakistani side of the border and there was a need to re-establish an Indian Punjabi capital at once. As Simla, the summer capital of the Raj, fell within the new Indian state of the Punjab, this was initially chosen. It was however most inappropriate for this task, being difficult to reach, and particularly so in winter, isolated from the Punjabi plains, and in its site incapable of modernization or expansion. It has subseqently become the capital of the new mountain state of Himachal Pradesh.

Rather than create a 'New Lahore' next to an existing city (which however was very much Pakistan's solution in building Islamabad) it was decided to build an entirely new city, and this was incorporated in India's *First Five Year Plan, 1951-6.* As early as 1950 an approach was made to Albert Mayer of the United States, a friend of Nehru, and he was asked to prepare a plan. This was done, but unfortunately a shortage of US dollars and the death of Mayer's chief assistant, when returning from India after a detailed study of the site, led to a curtailment of this first scheme.

The architects finally commissioned were Maxwell Fry and his partner/wife Jane Drew. They in turn suggested that Le Corbusier be appointed architectural adviser and after some early difficulty persuaded him to accept the post, together with his partner/cousin Pierre Jeanneret. From within this team it was Le Corbusier who produced the final version of the Master Plan, that of a Sector City. Essentially this was based on the principal that the city was comprised of semi-independent sectors which could be added to the basic infrastructure as it expanded. Provided that the essential services such as water, electricity and sewage disposal were adequate for the total population, the city could grow more or less indefinitely. Central services could be duplicated when the distance to them became significant without deviating from the overall concept. The present sector numbering system gives some idea of the way in which this system of enlargement has operated. For instance, Sectors 1-25 were the first stage; then 26-30 were laid out in the south east; and more recently 31-47 have been added in the south west, although about 10 sectors are still largely unoccupied. The overall plan was originally for half a million people, with each sector containing 5,000 to 20,000 people (the average was to be 15,000). But although some sectors were made non-residential it would seem that the present provisions will eventually allow for a population of over 600,000. In fact the town will undoubtedly grow to more than this, as the 1961 population of 99,000 had increased to 233,000 in 1971, and was estimated to be over 300,000 in 1978.

Le Corbusier's and the other architects' objectives were at the simplest level to provide the best possible man-made environment in which to work, reside and relax. The overall structure depended on Le Corbusier's long held philosophy of the separation of living space from traffic; and the neighbourhood provision of all basic services within walking distance.

Figure 12: Chandigarh: Mayer's original plan

In his role as architect Le Corbusier designed most of the important public buildings, while his colleagues dealt mainly with the sectors and their housing and public service buildings, such as schools, clinics and shops.

Having already considered at some length the context in which Lutyens and Baker created New Delhi, it would be a mistake not to do the same for Chandigarh, and to assume that the city is the result of unfettered and objective planning designed to meet the highest economic and social ideals. At all levels personal and political overtones and strictures have coloured the design and its execution, and there is at least as much to criticize as there is to applaud. How much more successful the result (so far) could have been is very difficult to say, as some of the questions which would have to be answered first have no simple answer: to what size should (or can) a city be planned? How do you stop it growing? How far into the future can the plan be expected to remain valid?

Chandigarh's Master Plan was the product of the evolution of garden city planning in both Europe and the USA. In concept it would have been surprising if anything other than a Sector Design had resulted for a population of about 500,000 or even for the later reduction to 300,000, as this was the only tried and tested model which adequately embodied the four functions accepted as essential in modern urbanism, namely living, working, playing, and circulating.

The first plan was the one drawn up by Albert Mayer, and comparison of this with the final version shows little physical change of a fundamental nature (see Figure 12), and the designation of Chandigarh as 'Le Corbusier's City' has certainly been questioned. Whatever the origin of the plan on paper, however, the circumstances dictated that its ultimate realization and characterization would be the product of a dominating spirit, in this the overwhelming, and at times overbearing, one of Le Corbusier.

It would appear that the American architect Albert Mayer was appointed at the end of 1949, but as early as October 1947 Mr P. L. Varma, Chief Engineer of the Punjab, was in the USA investigating city planning for the new capital of the Punab, and a site was chosen long before Mayer was involved, drawing the (inaccurate, but perceptive) comment from Nilsson that "the one small difference (with the choice of site for New Delhi) seems to have been that this time the site was chosen with the aid of an aeroplane instead of an elephant!" (S. Nilsson, 1973).

Mayer and his associates did all their work in New York and their plan was based on American garden city experience, itself owing much to Ebenezer Howard and the garden city movement in England, and in particular to a style incorporating vehicle/pedestrian separation known as 'Radburn Type' after a partially completed town of that name built in the 1930s in New Jersey. Mayer himself had been involved in the aborted creation of another New Jersey planned city in the early 1930s, that of Greenbrook. Chandigarh was clearly to be the realization of so much that had failed (for political and economic reasons) in the USA, and Mayer's plan showed a city of superblocks contained within a two-tier hierarchy of roads (see Figure 12).

The demise of Mayer's involvement is by no means easy to explain. With his chief architect, Matthew Nowicki, he travelled to India in mid-1950 to see what progress had been made in preparing for the start of construction, and was obviously dismayed to find that virtually nothing had

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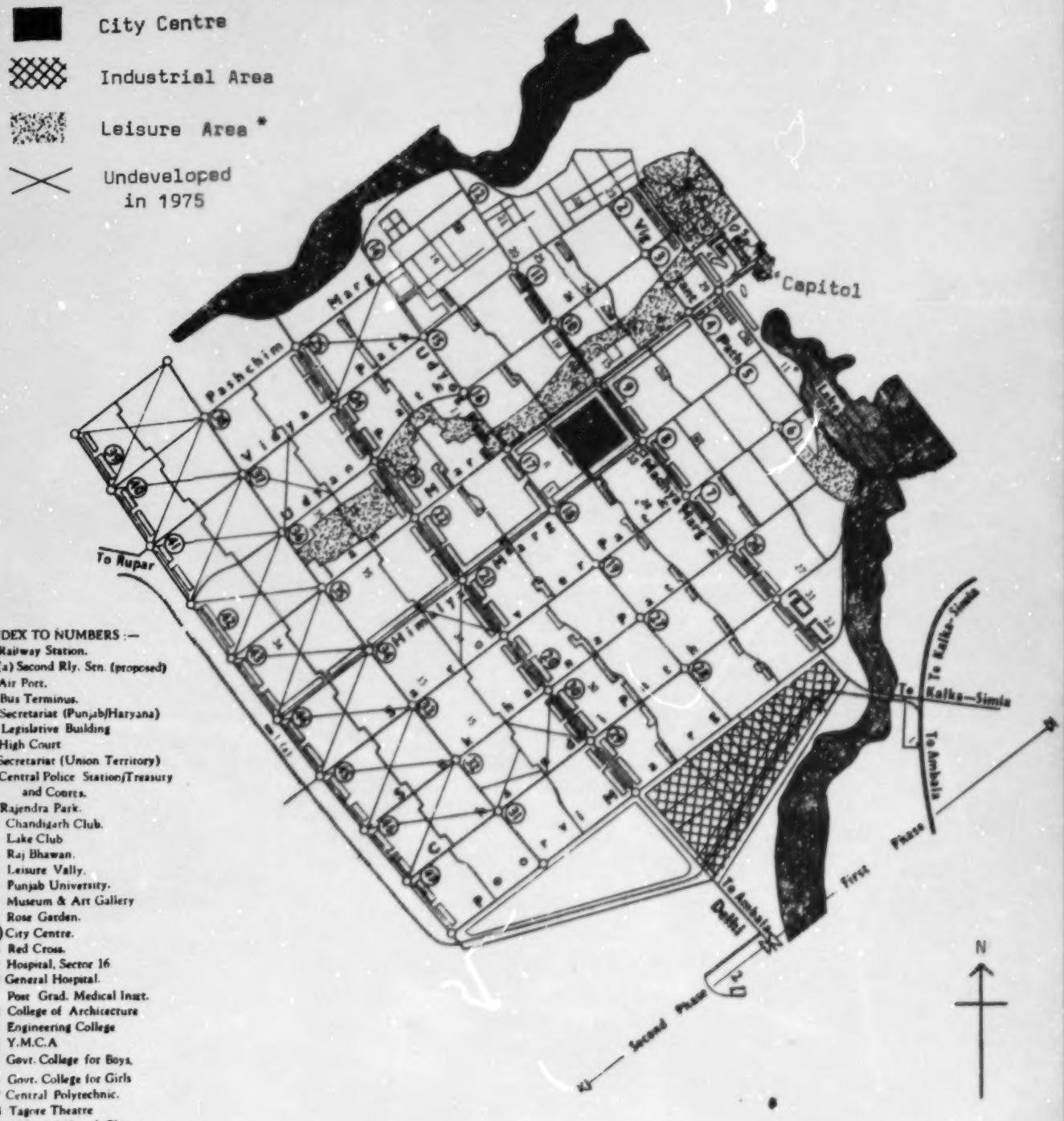

INDEX TO NUMBERS :—
1 Railway Station.
1 (a) Second Rly. Stn. (proposed)
2 Air Port.
3 Bus Terminus.
4 Secretariat (Punjab/Haryana)
5 Legislative Building
6 High Court
7 Secretariat (Union Territory)
8 Central Police Station/Treasury and Courts.
9 Rajendra Park.
10 Chandigarh Club.
11 Lake Club
12 Raj Bhawan.
13 Leisure Vally.
14 Punjab University.
15 Museum & Art Gallery
16 Rose Garden.
17 City Centre.
18 Red Cross.
19 Hospital, Sector 16
20 General Hospital.
21 Post Grad. Medical Instt.
22 College of Architecture
23 Engineering College
24 Y.M.C.A
25 Govt. College for Boys.
26 Govt. College for Girls
27 Central Polytechnic.
28 Tagore Theatre
29 M.L. As' Hostels/Flats.
30 Central Sc. Instr. organisation
31 Grain/Vegetable Market.
32 Timber Market.
33 Govt. Printing Press
34 Sub City Centre.
35 Defence Colony.
36 Industrial Area.

* A further but narrower strip of open space runs through all the other sectors in a similar way. (See 'Open Space' in Figure 14)

Figure 13: Chandigarh: Le Courbusier's final plan

been done, despite the detailed drawings he had provided, and the administrative infrastructure he had recommended. Feeling helpless in this situation he returned to the USA, but Nowicki who had stayed behind was offered a three year contract as City Architect for Mayer's plan. Had Nowicki not died in a plane crash in August 1950 it is possible that Mayer might have been more involved, but he had only been engaged to draw the original master plan, and he had already shown a distinct antipathy towards working in India. The Indians seemed unwilling to return to him and instead went to Europe after Nowicki's death.

Mayer's plan was still the accepted one when all the principals (except Jane Drew) - Le Corbusier, Maxwell Fry, Pierre Jeanneret and Albert Mayer - met at the site in February 1951. Le Corbusier was in fact only there because Jane Drew was unable to travel at that time, and his terms of engagement were technically limited to those of Architectural Adviser with specific responsibility for the Capital group of buildings. Despite all this, and having even turned the Indians down on their original approach to him, it was at this point that Le Corbusier took charge. On the spot he redrew Mayer's plan to be in essence the same as it is today (see Figure 13) and obtained Mayer's signature on the result, Mayer having been a virtually silent observer to his efforts. Mayer did not follow up further requests for collaboration and eventually withdrew entirely from the project (R. Walden, 1977).

The philosophy behind Mayer's original plan and Le Corbusier's revisions were most important as they explained so much about Chandigarh. In the main Mayer designed a garden city following the teaching of Ebenezer Howard whom he had done much to publicize in America. Chandigarh was to be "an essentially peaceful city, not one where complications must be counteracted by other complications" (quoted in N. Eveson, 1963). His prime concern was for the quality of domestic life as exemplified by the Indian village and realized in the neighbourhood units of his superblocks. He considered many Indian urban dwellers to be still villagers at heart. In the context of his life's work he at last had an opportunity to build a city which in the USA was impossible due to vested interests, but in India would be, in Nehru's own words: "free from the existing encumbrances of old towns and old traditions" (quoted in A. E. J. Morris, 1975). In addition, and not surprisingly, he disliked New Delhi's "overscaled sterility and stiltedness" and all that it stood for - "the class stratification and paternalistic symbolism of Lutyens' grandiose early nineteenth century "White Raj" urban designing" (*op cit*).

Le Corbusier's career had also had its setbacks. Despite his fame, and even adulation, Chandigarh was the only real opportunity he ever had to put his much publicized theories on urbanism and city planning into practice. It was scarcely surprising that it only took him four hours to redesign Mayer's plan, for in it he incorporated the philosophies he had been expounding for the last thirty years. Although his complex views, difficult language, and authoritarian manner do not make him easy to interpret there are several conclusions that can be made about his work at Chandigarh, and in the end clear reasons why his modifications were accepted.

At first sight it is the formal aspect of the final plan that is so striking, and the regularization of the street lines was a response to two all-pervading elements in Le Corbusier's vision of architecture and planning. The first was his desire to plan for the machine age, and thus define a city by its traffic pattern. One of the reasons for the non-

fruition of many of his plans was his stated intent "to create architectural machines serving the purpose of government and administration with the greatest efficiency" (quoted by S. von Moos in R. Walden, 1977) and into which man then had to fit. Le Corbusier clearly believed that a thorough understanding of physiology and its accommodation through modern technology was sufficient, and after that man would fit the module he had made for him. His own 'skyscraper', the Unite d'Habitation in Marseilles, and the sociological failure of high-rise developments in general bear witness to the falacy of this view. In Chandigarh the principles of the theoretical Radiant City, a vision of skyscrapers served by multi-level, multi-lane, high speed highways, have been realized, but in two dimensions and not three. As a result it has tended to be a highly compartmentalized and divided entity evoking the criticism that it may well become "a monument to one man's preconceived vision of a tidied-up society" (M. Sarin in R. Walden, 1977).

A second element was his over-riding desire to plan on a visually grand scale. Le Corbusier's work had never been discreet, and in Chandigarh he was able to plan not just a city, but a capital city in which his enthusiasm for authority could be dramatized and the 'temple of new India', as Nehru called Chandigarh, could be celebrated. Whereas Mayer had deliberately planned to avoid any symbolism, and the Capitol complex had been consciously separated from the rest of the city, Le Corbusier completely reoriented the design to make the Capitol buildings the symbolic head of the city, gathered together and approached by the major axis of a V2 road from the equally monumental central shopping centre. New Delhi's great vista of Kingsway and the grand dimensions of Lutyens' capital complex were much admired by Le Corbusier and his plan for the four buildings showed great similarities in scale and layout to those in the British capital (S. von Moos in R. Walden, 1977: 378). In fact it has been suggested that in the political climate following the Victorian era that although it was no longer possible to build on an imperial scale in Britain, India provided such and opportunity, and thus New Delhi was built as a monument to the fading British Empire. Mayer too saw India as a virgin land in which he could build, unhindered, the ultimate garden city, Indian style, only to be frustrated by circumstances and the forceful personality of Le Corbusier who, realizing the same potential, grasped the opportunity to at last create his own vision of a utopia originally conceived in the 1920s. In the end the size of the Capitol buildings were reduced and the Governor's Palace left out, being considered inappropriate in socialist India. But once again pre-garden city planning had surfaced in India, albeit this time more directly in the service of Indian society. But whatever the links with the Capitol of New Delhi, the creation of Chandigarh was probably Le Corbusier's greatest architectural achievement. Despite all the odds against such an interpretation of the Mayer plan, the resultant symbol of a new and powerful state was wholeheartedly accepted. Nehru in particular backed the architect, and as well as becoming a symbol of the new Punjab Nehru saw Chandigarh as "the first large expression of our creative genius, flowering on our newly earned freedom" (S. von Moos, *op cit.* p.440).

Much more than Mayer's plan, Le Corbusier promoted "the ideas and values that the new Indian elite wanted to celebrate", and with his dominating personality, clear vision, and leadership, an impetus was created that swept all before it. In this respect Chandigarh is Le Corbusier's city (S. von Moos, *op cit.* p.440).

The expression of Le Corbusier's ideas on the separation of fast-moving

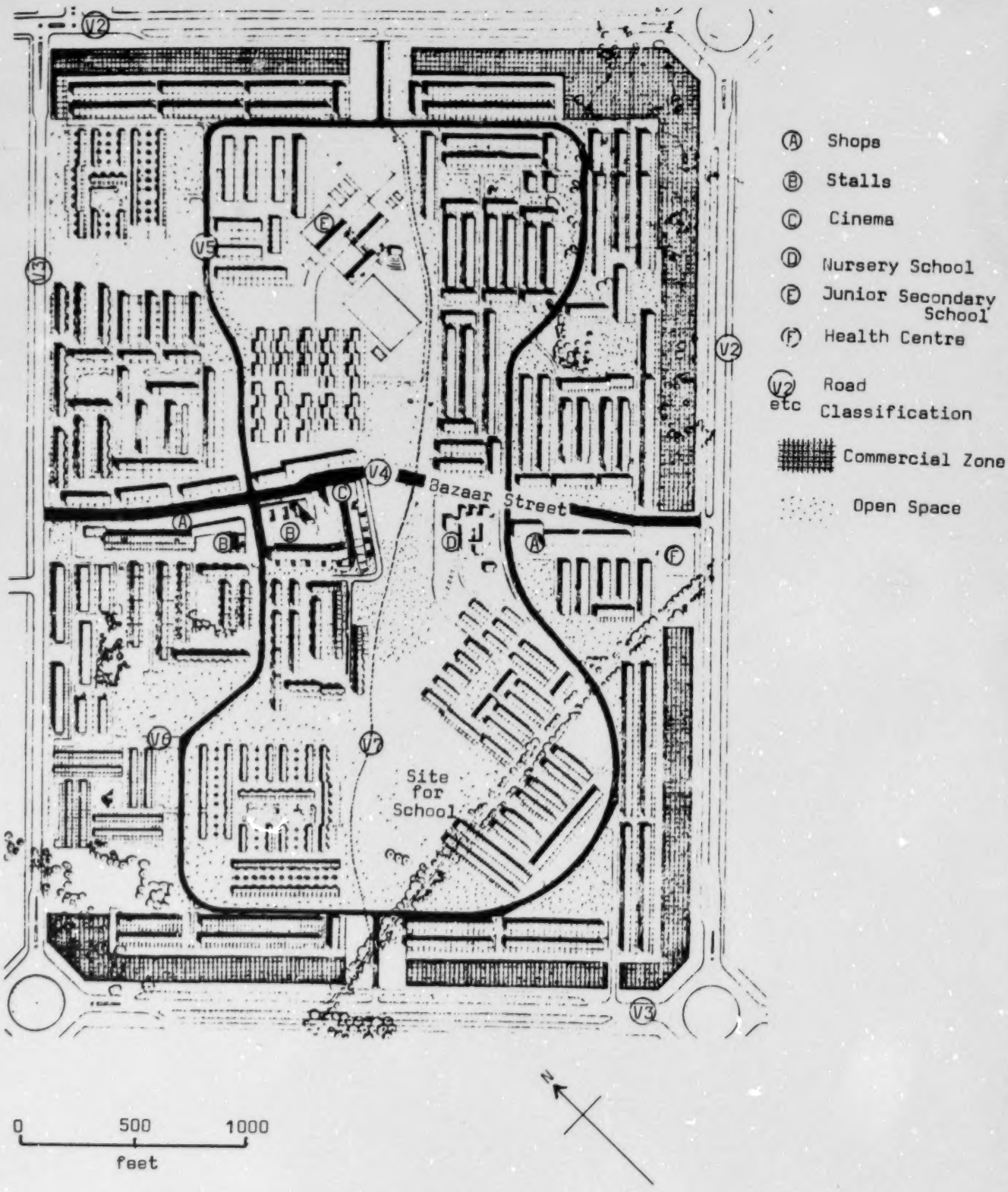

Figure 14: Sector 22
(After Jane Drew, *Marg*, 1961)

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traffic was embodied in the so-called '7 V Rule' or 7 types of road (*voie* = road in French). These can be summarized as (with Chandigarh examples in brackets): (see Figure 14)

V1 Inter city (7 roads, e.g. from Delhi, Simla, Patiala, etc.)

V2 Access to major public services (several of the main crossing roads, notably the two that meet at the northern corner of Sector 17, the central shopping zone)

V3 Fast through traffic (all the roads between sectors that are not V2)

V4 Access to daily domestic needs (all the roads that cross each sector from south east to north west)

V5 Loop roads off the V4 roads, providing access to housing (often a crescent or figure of eight road)

V6 The paths to the doors of dwellings

V7 Paths and tracks giving access to schools, recreational areas (through or alongside the linear parks), etc.

V8 An addition to suit local circumstances - cycleways beside the V2 and V3 roads, eventually underpassing them to give access between the sectors.

It is the V2 and V3 roads that divide the city into its sectors, which measure about half a mile by three-quarters of a mile. The width of these roads certainly seems excessive at present, and the little scooter taxis (= *tongas*), and bicycles (130,000 in use in 1978) that are the major users seem very vulnerable on them, hence the afterthought of the cycleways. Because the scale is so big there is undoubtedly a clash between the available means of transport and the distances that have to be travelled by workers in certain occupations, notably those concentrated in the Government, Sector 1 - the Secretariat alone employs 4,000 - and in the industrial zone to the east. It is sometimes overlooked that the sector principle of self-containment only applies to the domestic side of life, and when major functions are centralized distances become considerable. In the absence of adequate personal transport an efficient public transport system is necessary, partly provided here by buses, but with all the attendant limitations of the system. Cost has no doubt prohibited the use of any other mass transit system.

A study of bus routes in 1973 (H. Schmetzer *and* P. I. Wakely, 1974) showed the Capitol area, university and Sectors 20-23 (those mainly inhabited by the lower paid government employees) and 27 as the best served areas (see Figure 15). Notably weak in the system were services to the industrial area and the south west ('bottom') sectors where the so-called 'labour colonies' and unauthorized and recent settlements were located. The sector access roads (V4s) not originally planned for bus use were in fact the basis of the 20 routes in operation at that time and have become trans-sector roads.

Nevertheless it was determined that the fast traffic V2 and V3 roads be isolated, in much the same way as railway lines are, from the dwellings, and to this end there was no direct access to them apart from the specifically designed V4 sector access roads. In many areas walls were built to prevent unathorized access to the fast traffic roads, and the narrowness and bends built into the access roads, together with the fact that their exits were offset from each other, was supposed to discourage their use for transit purposes.

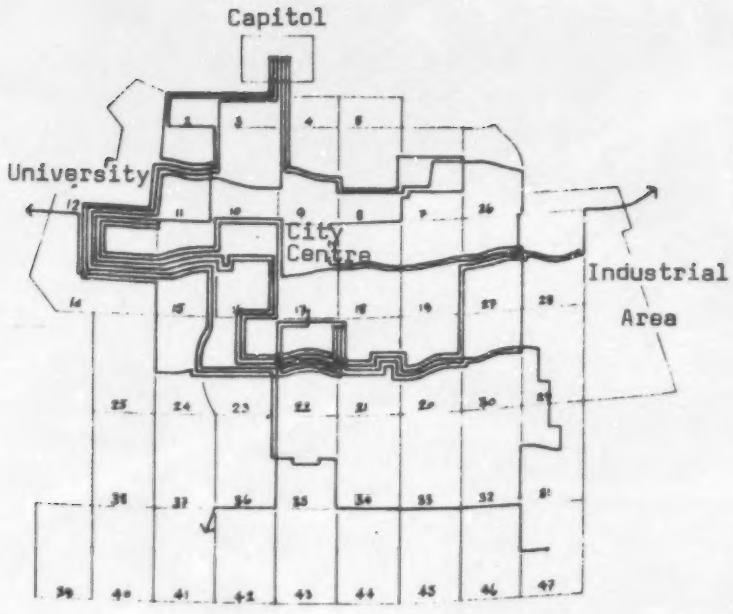

Figure 15: Chandigarh bus routes in 1973
(H. Schmetzer and P. Wakely, 1974)

Crude as the grid plan of main roads might appear at first sight, it was not only the widths and functions that had been carefully thought out, but also the orientation which provided all the 'up and down' roads with a clear view of the Himalayas to the north east, and so prevents the loss of orientation common to New Delhi's radial system. In addition the crossing roads, which are in fact slightly curved, run north west to south east and therefore shield drivers from the low rays of the setting sun. The distance between intersections has also been carefully considered and is in striking contrast to the traditional Indian grid because it is so big. In most Indian cities the grid system is usually related to pedestrian and animal speeds and intersections at roughly 100 yard intervals would be common. As motorized traffic moves at about ten times this pace the sides are that much bigger - about 900 x 1300 yards.

This then is the layout of the city. At present there are no traffic lights, and Le Corbusier intended that flyovers or underpasses would be installed when necessary, as the present roundabouts would probably become bottlenecks if traffic ever grew to match the street widths.

Such a loose and inadequate transport system often reflects a dispersed and low density population, but it would be untrue to claim that densities are too low in Chandigarh. In fact they are well above normal new town standards at between 21/acre and 83/acre within the sectors. Le Corbusier originally suggested 75, 50 and 25 persons/acre with a tripartite division of plot size based on income. About 5 per cent of the population fit into the upper class category and occupy Sectors 2-5, while Sectors 6-19 house middle income groups and the sectors after 20 are mainly inhabited by those earning less than 350 rupees a month. This still left 15 per cent of the city population unaccounted for and living in unauthorized fringe settlements. About a third of these were building labourers and necessarily difficult to accommodate at any time, but another third were government employees who should clearly have been planned for, as indeed should the remaining group who were mainly employed in the lowest grade of personal services such as sweepers (general name for anyone employed in garbage or waste disposal), cobblers, hawkers, *tonga*-drivers, etc. As a result of the very high densities in these areas the total density for all Chandigarh is 80/acre, higher than envisaged for any single sector. In fact several of the low status sectors had exceeded their planned population as early as 1971, notably Sectors 20-23, and 27, the latter 38 per cent over target (H. Schmetzer *and* P. I. Wakely, 1974).

The residential area is embodied in 30 of the first 36 sectors. Sector 22 was an experimental one, but each sector layout is different in detail, as are housing types and styles. On the debit side must be considered several of the forces already noted, both Indian and British Colonial in origin. Already mentioned (see New Delhi section) was the overlooking of housing provision for the very poorest. Jane Drew, the architect most concerned with this, was originally working on a budget of £244 for a *peon's* house, the lowest of thirteen grades. She subsequently provided a class of housing for only £154, for the lowest grades of all - the ubiquitous sweepers. This was an astonishing achievement, especially when it is realized that these houses contained two rooms, verandah, kitchen, and w.c. plus a courtyard. This was largely made possible by the extremely low labour wages and price of bricks at £1.50 per thousand! Nevertheless providing housing for the poorest is an intractable problem faced by all cities, and shanty towns both exist and are spreading in Chandigarh despite low construction costs. There is in fact an undersupply of housing of all grades in spite of the rapid early progress.

Regrettably, the classic problem, exemplified in New Delhi, is rampant in Chandigarh as well. Although initially the State built the bulk of the housing, and 80 per cent of this was for the lowest recognized grade of workers, financial problems have led to the auctioning of lots to private builders and today over 70 per cent of all construction is in private hands. Given the shortages for all income groups it is inevitable that all this building is for the upper income groups. Even so, prices are so high that every new building, whatever the planning controls in force, is inhabited by multiple tenants or owners, and many standards have deteriorated. That the authorities should have so readily relinquished control of the planning process is perhaps the single greatest criticism and the source of greatest conflict among those involved in the project.

Another feature, present in both Jaipur and especially New Delhi, has been the location of the best houses at the head of the city near Sector 1, the Capitol Sector, reserved for the various ministers, judges and senior civil servants who work there. To some extent this is ameliorated by the deliberate mixing of housing grades in each sector, and there are of necessity not many such high-ranking personnel, nor are their houses and grounds especially lavish (the original budget was £4,875 for grade 1 housing). The development of the industrial estate should in time provide a partial counterbalance to this situation, but the problem is in fact more deep seated than this. It is clear that there has been some compartmentalization of society despite the effort to avoid the social rigours of the caste system, and it has been observed that the old caste ghettos have merely been replaced by a new category of self-conscious clusters based on income which in turn reflects to a very great degree the entrenched bureaucracy of the Indian civil service - "Chandigarh undoubtedly lacks civic warmth, which is due largely to the lack of human warmth in the Indian bureaucracy" (S. K. Gupta, 1974:365).

While no planner could probably have prevented this aspect of the society from asserting itself spatially in some form, or eliminated the concentrations of employment in the Capitol, university and industrial areas, there must undoubtedly be criticism of the lack of employment provision within the sectors themselves. In particular there is no provision for the development of self-employed activity in the sectors, where it is in effect prohibited in most cases, and this is a serious compounding problem as it means that most workers do have to leave the sectors to work. This is a pity as much industry is generated from home enterprises in India, and the separation of home and workplace is still relatively novel both socially and economically.

The design of the houses themselves was given a great deal of attention and much time was taken to listen to the requests of their potential occupants. At the institutional level and led by an almost pedantic desire from Le Corbusier to tame the sun and heat of the Punjab plain, was the ingenuity shown in keeping buildings cool cheaply. The most spectacular solution was an entirely separate 'umbrella' roof over the High Court, which in addition has a decorative but cooling pond running across the front of it. A whole variety of less lavish means were used to keep interiors cool in the houses, big rooms, small and sunken windows, balconies, ventilated roof spaces, window shades and sunbreakers, brick grills and *jallis* (perforated screen walls). For the cheapest houses, always built of the cheapest material - brick - a simple solution was the 'egg-box-sunbreaker', made by the projecting of alternate bricks out of the walls so that they shaded the rest of the wall. Although they collected heat much of it was radiated upwards and not convected inside (see photographs in

R. M. Panjabi, 1958; and *Marg*, 1961).

On the inside of the houses several 'traditions' were overturned. It was discovered, for instance, that housewives did not like only one room, and no houses were built with less than two as a result. Nor did they like cooking on the floor and this arrangement was abandoned as the architects got to know the inhabitants, particularly in the experimental Sector 22 (see Figure 14). Many other details were improved as time went on, at all levels of housing.

Within the sectors the housing was grouped, especially so for the cheaper types where terracing was common. Often cooling and shade could be cheaply achieved collectively where otherwise it would be expensive for small houses, and also there were communal facilities to be considered and a greater need for social unity in these areas.

The provision of housing was acknowledged to be the largest and most complex problem of all, and the architects were perhaps their own biggest critics. Their interest and perserverance did mark a significant change in emphasis that should not be overlooked when comparing Chandigarh with other planned cities in India, for it was here that it was finally recognized that a town was housing above all else. Le Corbusier typically described the sector as the "container of family life." (Le Corbusier, in *Marg*, 1961:6).

Retail and related services exist on two levels, the most used and widespread being the sector shopping precincts on the shaded south side of the V4 access roads. Provision was made for expansion along this road in either direction, but not across it, so it would not be necessary to cross the road while shopping. The development of these shopping streets has a curiously European flavour in the heterogeneity of services provided on the one hand, but lack of many amenities on the other. Indian shopping streets are indeed heterogeneous in character, but the mix is one of manufacturing, wholesaling and retailing, and of selling, re-selling, repairing and exchanging, rather than of a simple mix of retail services. The European model depends very much on chain stores, franchises, and ready access to wholesale suppliers, all absent in India. Much food is necessarily sold unpackaged as it becomes available, and market stall-holders are the main vendors for most fresh and cooked food. The mobile seller - *rehriwallah* - is much preferred to the shop, which thus hardly exists for many commodities. As well as being a mobile shop the *rehri* is commonly seen more permanently sited at a 'market' - any piece of rent-free land that can be found - as indeed are the sellers of cloth and many other commodities. The north side of the sector shopping streets has been favoured by him and this has caused great conflict with the established plan and with the authorities. All attempts at providing these facilities for the *rehriwallahs* has failed if rent has been involved. (It can be noted that Mayer's original plan called for market squares, not streets.)

Also neglected has been any provision for specialized activities, such as furniture, electrical goods, bicycles, car parts and repair, etc. In most Eastern cities whole streets will be devoted to every aspect of such a trade, and the great *bazaars* of Jaipur were very much of this nature. In Chandigarh they have developed spontaneously and unplanned, for instance in Sector 18 where the whole shopping street has been taken over by sanitary-ware merchants and in Sector 20 where motor and bicycle parts and repairs are dominant (H. Schmetzer *and* P. I. Wakely, 1974).

Without the capital needed to establish and stock major stores (or garages) this is an inevitable and essential activity.

Sector 17 was termed the 'city centre'. Described as a cross with the junction of the arms forming an open piazza, its actual shops differ little from those of the sectors. Even in relatively affluent Chandigarh the Western style shopping parade has been slow to materialize. The open space of the piazza is abhorred in the climatic conditions, being too exposed to heat, dust or rain, and it appears as the antithesis of the detailed planning of the domestic sectors. Vendors crowd together in the limited shade, the rest is empty.

Partly due to historic accident much of the city centre activity has been developed in the adjacent Sector 22, for this had one of the first shopping areas to be built, and prior to the construction of Sector 17 contained the main banks, businesses and the only cinema. Some of these services have not moved out, and in addition a large dry goods market - Shastri Market - developed unofficially, and despite being demolished in 1972, market forces have sustained its subsequent illegal rebuilding.

Education and health care have been given outstanding provision by even the most demanding standards, and indeed Chandigarh was always planned to be an educational centre. As well as a full complement of schools, state, private, and convent, a whole range of further (e.g. Government Art College; Industrial Training Institute; Central Craft Institute for Women), higher (The University, Postgraduate Medical School; Polytechnic for Women; etc.) and specialist institutions (Institute of Engineers; Home Science College; Architecture College; etc.), together with teacher training colleges have been established.

Incorporated in the sector concept was the objective that every household should be within 15 minutes walking distance of school facilities. Usually several schools serving different levels and sexes are found, clear of the *bazaar* road, and located within the central green band which in general provides leisure space in each sector. As the map shows (see Figure 13) running through the sectors in a longitudinal direction are eight green swathes (Mayer originally had two) which, although at present needing landscaping and organization outside the areas of sports clubs and school playing fields, was Le Corbusier's answer to Green Belts and park provision. There is a more developed leisure zone, known sometimes as 'Leisure Valley', similarly located, but broader and based on the presence of a small river bed running from Sector 1 through 5 to 42. This includes some notable developments, including a 30 acre Rose Garden in Sector 16.

This lavish provision of leisure space has not been entirely successful so far. The main problem stems from the fact that each sector has about the same proportion of recreational space regardless of density, with resultant over-provision in the less dense sectors, where middle and upper income families with large gardens and greater mobility need it less any way. In these sectors disuse, neglect and misuse are apparent, and only in the densest sector of all, number 22, is there full use and good maintenance of public space at present.

Extension of the city to the south west is currently underway, and it can be seen how readily the pattern can be maintained with the Leisure Valley and other leisure strips extending through the sectors as development progresses. Drainage occurs naturally away from the hills as

the line of valleys indicate, (see Figure 13) and the slope of about 1:100 is ideal for sewerage, water supply and street drainage. Water supply is unfortunately one of the problems not yet overcome and one which critics forecast from the beginning. Water pressure is invariably insufficient to provide a head in upstairs rooms and much of the extensive landscaping obviously suffers from a lack of water. This seems to be essentially a question of cost and engineering rather than of planning, however.

Health care is well provided for and includes a major postgraduate medical college, general hospital and a military hospital. Health centres have been designed with a great deal of care in each of the sectors, usually on the *bazaar* road, and in Jane Drew's words each "was designed to keep people healthy rather than (be) the usual kind of outpatients' clinic, and (is) a centre for preventive medicine and child welfare" (*Marg*, 1961).

The Capitol (Sector 1) is a natural focus of attention, lying as it does against the panoramic backdrop of the Himalayas, and it is interesting to contrast its impact with that of the Capitol buildings in New Delhi. In the latter there seemed to be something of the Washington D.C. vision of dominance and power, of a commanding presence approached along a sacred and uncluttered mall, while in Chandigarh, for all Le Corbusier's admiration of the scale of New Dehli, the architecture and setting are far more pragmatic, and do not command the city. To some the ulility of construction may detract entirely from the general regard in which the buildings are held, being for the most part constructed of concrete deliberately left bare to show the shuttering pattern. The recent buildings of the South Bank entertainment complex in London illustrate the style, first introduced by Le Corbusier himself in the 1930s. There is little if any of the detailed decoration of traditional Indian architecture, which is superbly expressed in Jaipur and which Herbert Baker overlaid on his essentially Italianate style secretariat buildings in New Delhi. Chandigarh's Secretariat is really nothing more than a rather large office block at first glance, and sensitive as ever Le Corbusier oriented it end on so that far from dominating the city it would only minimally interupt the view to the Himalayas. The whole site was separated from the town by a canal constructed from an existing stream, and laid out in a garden setting with partly sunken roads and artificial hills. One of the atrractions of Le Corbusier as an architect was that to the last detail his style was functional and explicit. Typical of such detail were the two ramp accesses in place of stairways, one on either side of the Secretariat, to all floors of this building. As well as being less tiring than stairs they allow easy movement of bulky or heavy goods, and in fact were used by donkeys and labour alike during construction. The necessity for lifts was thus minimized.

Similarly the lake - Sukhna Lake - was not simply an obvious piece of landscaping, but was placed carefully to reflect the hills behind, cool the wind and catch the dust.

The limitations of a Green Belt in providing leisure space have been indicated, and the leisure areas usually found in one have been provided in a more integrated fashion. Green Belts are more noted for their function as a limit to uncontrolled growth. In Chandigarh expansion planned or otherwise was naturally limited on two sides by the two rivers, Patiali Rao and Sukhna Choa, and the areas adjacent to these were taken over by the authorities for specialist uses, in the north for the

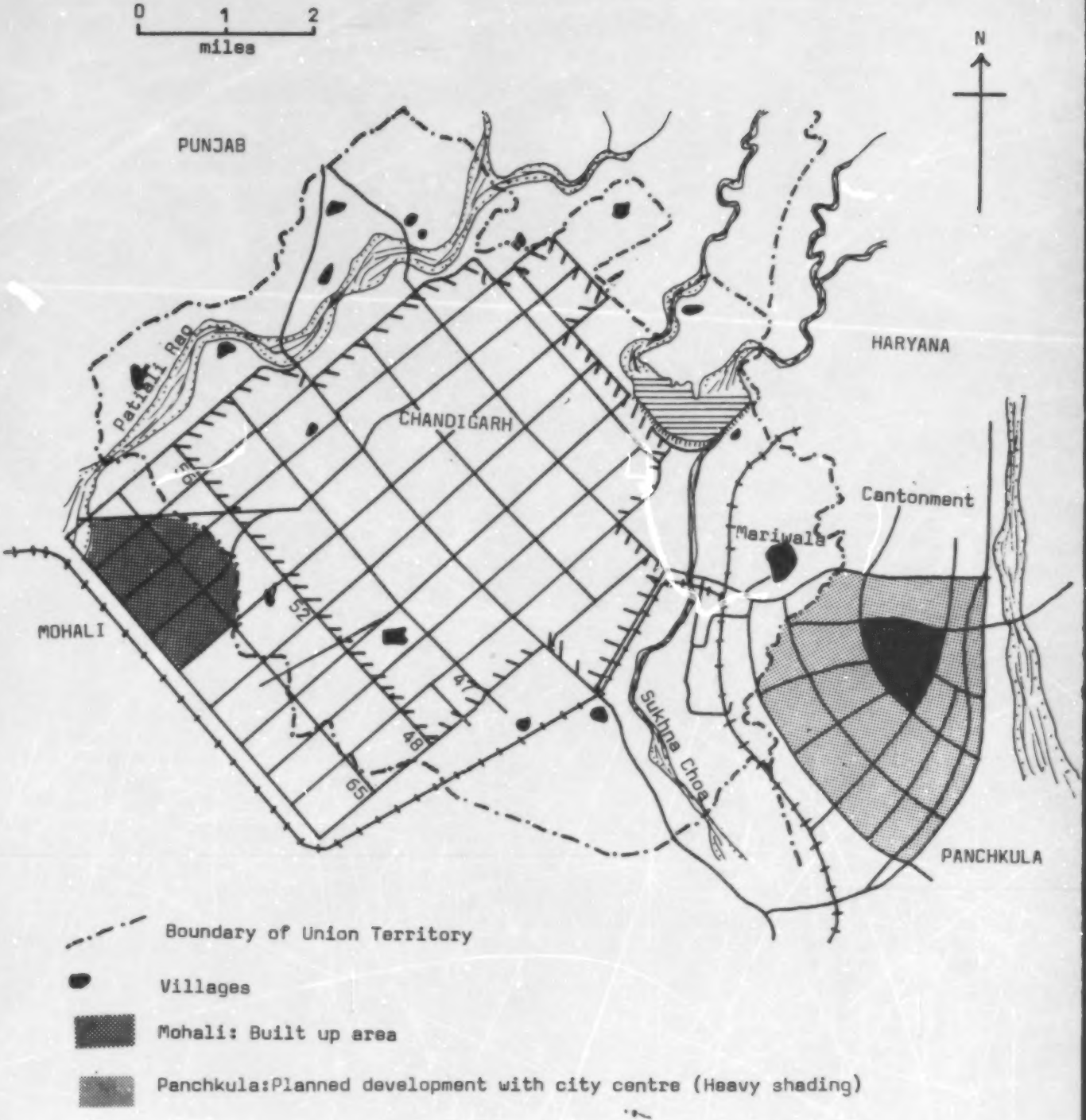

Figure 16: Planned settlement outside Chandigarh: Mohali and Panchkula
(Based on Government of India Maps,
and H. Schmetzer and P. Wakely, 1974)

university campus and botanical garden, and in the south by wholesale and industrial use. To the north lay the Himalayas and further extension in that direction was pre-empted by the creation of the lake, the carefully landscaped Sector 1, and the adjacent sports and swimming club (see Figure 13).

To say that development is fully controlled and that Chandigarh will be allowed to evolve in a planned framework would be far from the truth, however. Close control of building is only within the city's power as far as its boundaries, and there is no policy governing settlement in general, either at the state or national level. As a result two potentially disruptive, but perhaps initially complimentary, townships have arisen nearby. As early as 1968 the Punjab State began the urban estate at Mohali, a district immediately south west of Chandigarh (see Figure 16) and sometimes designated Chandigarh Phase III, for it lies in Sectors 53-56 and 62-65 of an unofficially extended plan of the city. The significance of this location is that it liea across the border of Chandigarh's Union Territory and thus comes under the control of the State (an area of some 144 square miles has been designated as Union Territory since 1966 and until such time as a new capital can be built for Haryana, which at present has to share the Capitol facilities with the Punjab) rather than the National government as Chandigarh does. The slow development of housing in the new city and its inability to satisfy the needs of the lower paid has prompted the relatively affluent Punjabi Government to take matters into its own hands and some seven sectors have been involved in residential, commercial and industrial development. Residential sectors have been planned on a similar basis to the master plan, but include 155 industrial sites of various sizes. Tractors and vehicle tyres are two of the major manufactures on the larger sites (Schmetzer *and* Wakely, 1974).

The river Sukhna Choa forms the eastern limit of Chandigarh and the border with Haryana. Immediately across it is the new town of Panchkula (see Figure 16), promoted by the Haryana government for much the same reasons as the Punjabis promoted Mohali, although here there is no suggestion of extended sectors. The plan is quite independent of Chandigarh's, but in some respects a miniaturization of it, with mini-sectors, grid roads and land use zoning for residential, industrial and commercial purposes.

Chandigarh provides so much that is absent in India that its main criticism is very much for doing just that (e.g. Mathur *and* Madgwick, 1978) and providing a typically middle class environment. If the suggestion implicit in this is that a city should have been built for India's poorest classes the endeavour would surely have been hopeless, especially given the context of Chandigarh as a capital city. Houses down to a cost of £150 have been provided and those who cannot afford them - and many cannot - will need a degree of institutional assistance beyond the scope of the planner to initiate and so far outside the ability of poor nations to pay for.

The appearance of the city as a sort of Milton Keynes transferred to the Punjabi Plains, simply because certain planning principles are common to both, does not bear inspection in detail, and those who would wish Indian style architecture seem to mean the colonial style bungalow with verandahs all around, cool but expensive in both building costs and space consumption. Difficulties with water supply and the extremely rapid pace of growth so that the demand far exceeds supply have created many difficulties, but these are circumstantial, not inherent. The grass can be

made greener, the dust will be less as building activity declines, and given time the wayside trees will grow. Compared with most Indian cities Chandigarh is clean, attractive and well-equipped. Le Corbusier and his colleagues, in the words of one commentator, have at last "wrung out the heritage of indifference and bad taste left by the Victorian British minds who ruled (India) for two centuries" (Editorial, *Marg*, 1974).

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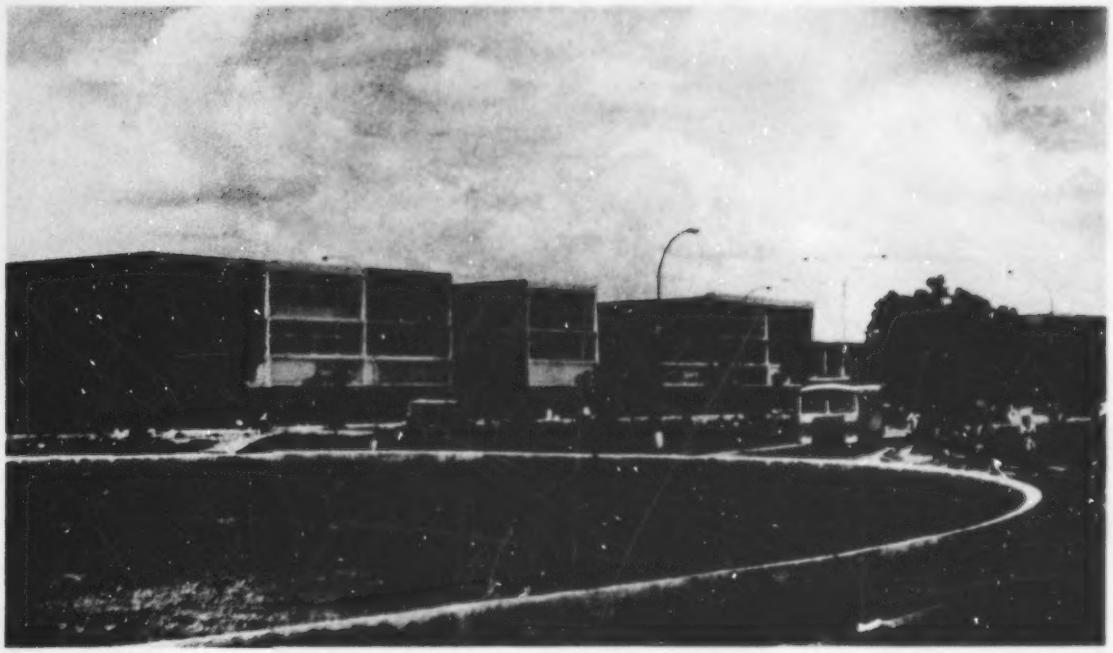

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